5.0 AFFECTED ENVIRONMENT AND SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS

The environmental review was conducted within regulations established under the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) procedures for compliance with NEPA, and implemented by Federal Highway Administration (FHWA) and Michigan Department of Transportation (MDOT) guidelines and regulations. In the environmental analysis process, a range of social, economic, and physical conditions, potential impacts, and mitigation measures are evaluated.

This section evaluates impacts that may result from implementation of each of the proposed project alternatives. Impacts are defined as changes to the existing environment that are a consequence of the proposed action and can be characterized as either direct or indirect. Direct impacts or effects are caused by the action and occur at the same time and same place of the action (e.g., noise impacts, habitat disturbance, impacts to cultural resources sites). Indirect impacts or effects are those caused by the action and occur later in time or at some distance from the project location (e.g., changes in development and growth patterns, off-site traffic). Where applicable and appropriate, measures to mitigate impacts are identified.

The information pertaining to existing conditions was assembled from a variety of sources, including a review of public records and databases, consultation with government agencies, meetings with the public, and field reconnaissance. The environmental impacts are based on qualitative and quantitative analyses, including studies such as air quality and noise analyses, cultural resources, hazardous materials, and other technical and engineering studies.

To describe and analyze the project area, I-94 (Edsel Ford Freeway) has been divided into three segments, shown previously in Figure 2-6 and listed here from west to east.

- Segment A extends from east of I-96 to Cass Avenue, and along the M-10 (Lodge Freeway) north to Pallister Avenue and south to Forest Street.
- Segment B extends along I-94 from Cass Avenue to Chene Street, and along the I-75 (Chrysler Freeway) north to just north of Grand Boulevard and south to Warren Avenue.
- Segment C extends along I-94 from Chene Street to Conner Avenue.

5.1 Social Environment

5.1.1 Existing Social Environment

This section describes the current population, housing, community facilities and services, non-vehicular mobility, and neighborhood and community character and cohesion.

5.1.1.1 Population

Data used in the analysis of past, present, and future populations were obtained from the U.S. Census Bureau, Southeast Michigan Council of Governments (SEMCOG), and the Office of the State Demographer of the Michigan Department of Management and Budget (MDMB).

Data from the 1990 U.S. Census are used because, although it is 10 years old, it is the most recent, detailed source of demographic information. New census data will not be available until data from the 2000 census are compiled. The current sustained national and state economic expansion coupled with the accelerating rate of redevelopment activities within the city of Detroit have altered the 1990 economic indicators (such as unemployment levels presented in this document). However, 1990 census data were used because they provide detailed information and a common base for evaluating socioeconomic indicators. They are presented for comparison purposes. If 2000 census data are available during preparation of the Final Environmental Impact Statement (FEIS), the data in this DEIS will be updated, compared with the 1990 census, and reevaluated.

The U.S. Census Bureau compiles statistics for census tracts. In Detroit, a census tract is an area containing an average of approximately 4,000 people and is bounded by streets on all sides. Figure 5-1 shows the census tracts used to analyze the socioeconomic effects of the proposed project.

Population and housing data within the project area were analyzed and compared with similar data for the city of Detroit and Wayne County. As shown in Table 5-1, the 1990 population for the project area was 48,406, which was 4.7 percent of Detroit's population. In 1990, Detroit had a population of over 1 million people, almost one-quarter of the 4.6 million people in southeast Michigan.

Table 5-1
1980 and 1990 Population Figures

	Population		
Location	**1980**	**1990**	**Change**
Project Area	71,685	48,406	-32.5%
Detroit	1,203,337	1,027,974	-14.6%
Wayne County	2,337,891	2,111,687	-9.6%
Southeast Michigan	4,682,000	4,590,000	-2.0%
State of Michigan	9,262,044	9,295,277	0.4%

Source: U.S. Census Bureau, 1980 and 1990

The population of Michigan increased slightly (0.36 percent) between 1980 and 1990. In contrast, southeast Michigan experienced a decrease in population of about 2 percent from 1980 to 1990 as shown in Table 5-1. Within the same time period, the population of Detroit declined by more that 14 percent. The population of the project area declined

by more than 32 percent. This is more than twice the population decline experienced by the city and 16 times more than the region's decline from 1980 to 1990.

Recent population estimates from MDMB and SEMCOG indicate that the population of the state and the region is growing, as indicated in Table 5-2. The population is expected to increase by approximately 17 percent and 11 percent, respectively, by the year 2020. However, the population of Detroit is predicted to continue to decline although at a slower rate. Forecast numbers are not currently available for small areas; therefore, future population estimates for the project area are not included in Table 5-2. It is reasonable to assume that the population of the project area would follow the city of Detroit's population pattern. After 2000 census figures are released, and during preparation of the FEIS, projections will be updated.

Table 5-2
Current and Projected Population

Location	1990	2000	2010	2020	Change (1990 to 2020)	
					Number	Percent
Southeast Michigan	4,590,000	4,804,400	4,962,600	5,162,400	572,400	11.1%
Wayne County	2,111,700	2,055,000	1,992,300	1,961,400	-150,300	-7.1%
City of Detroit	1,028,000	952,000	884,300	837,300	-190,700	-18.6%
State of Michigan	9,295,300	9,931,100	10,322,600	10,879,300	1,575,000	16.9%

Sources: Southeast Michigan Council of Governments (1996) and the Office of the State Demographer of the Michigan Department of Management and Budget (MDMB) (1999).

Selected population characteristics for the project area, Detroit, and Wayne County are shown in Table 5-3. These characteristics assist in describing the residents of the area and how its population compares with the surrounding area's population. The selected population characteristics also provide useful information regarding specific subgroups that may be impacted by the project.

The project area's population is younger than that of the city and the county. The median age for the project area is almost 27 years, which is 4 and 6 years younger than the median age for the city and county, respectively.

The project area contains a higher percentage of African Americans (87 percent) and a smaller percentage of Caucasian and other groups (13 percent). The percentage of African Americans in Detroit and in Wayne County is 76 percent and 40 percent, respectively. Nearly half of the households in the project area are classified as families. This proportion is smaller than the two-thirds of households classified as families in Detroit and Wayne County.

Table 5-3
Selected Population Characteristics of the Project Area, City of Detroit, Wayne County, and Michigan

Population Characteristic	Project Area	Detroit	Wayne County	Michigan
Total Persons	48,406	1,027,974	2,111,687	9,295,297
Median Age	26.5	30.9	32.5	32.3
Males as a Percentage of All Persons	47.1	46.4	47.3	48.5
Females as a Percentage of All Persons	52.9	53.6	52.6	51.5
Persons 65+ Years as a Percentage of All Persons	13.1	12.1	12.5	11.9
Persons Under 18 Years as a Percentage of All Persons	28.2	29.4	27.0	27.9
Caucasians as a Percentage of All Persons	10.0	21.6	57.4	83.4
African Americans as a Percentage of All Persons	87.4	75.7	40.2	13.8
American Indian, Eskimo, or Aleut as a Percentage of All Persons	0.3	0.3	0.3	0.6
Asian or Pacific Islander as a Percentage of All Persons	1.9	0.8	1.0	1.1
Hispanic Origin Persons (Any Race) as a Percentage of All Persons	0.7	2.6	2.3	2.1
Total Households	18,452	373,857	780,493	3,419,331
Persons Per Household	2.61	2.71	2.67	2.72
Families as a Percentage of Households	51.1	66.2	69.5	71.3

Source: U.S. Census Bureau, 1990

Table 5-4 shows selected income and disability characteristics for the project area. The 1989 household income for the project area is lower than the household income for Detroit, Wayne County, and Michigan. The median household income for the project area in 1989 was $11,438, compared to $18,742 and $27,997 for Detroit and Wayne County, respectively. The median household income for the state in 1989 was $31,020.

The project area has a lower proportion of unemployed (13.0 percent) than the city (19.7 percent). Project-area unemployment is comparable to that of Wayne County (12.4 percent). Both are higher than the state unemployment level of 8.2 percent. The project area has a higher proportion of persons below the poverty level than Detroit, Wayne County, and the state.

In 1989, the federal poverty level was $9,885 for a family of three. The project area household income was above the federal poverty level. The project area per capita income was $6,709, which was above the 1989 federal poverty level of $5,980 per capita.

Table 5-4 also contains information on the percentage of working-age persons (18 to 64 years old) with a mobility and/or self-care limitation. The percentage of disabled persons in the project area (8.9 percent) is lower than the percentage in Detroit (13.8 percent) and Wayne County (11.0 percent). The data in Table 5-3 and 5-4 is presented to compare ethnic population, income, mobility, and unemployment of the I-94 project area to Detroit, Wayne County, and Michigan.

Table 5-4
Income and Disability in the Project Area

Population Characteristic	Project Area	Detroit	Wayne County	Michigan
Median 1989 Household Income	$11,438	$18,742	$27,997	$31,020
Per Capita Income	$6,709	$9,443	$13,016	$14,154
Persons Below Poverty Level in 1989	40.4%	32.4%	20.1%	13.1%
Persons 18 to 64 Years Old With a Mobility and/or Self-Care Limitation	8.9%	13.8%	11.0%	5.6%
Unemployed Persons 16 and Older in Labor Force	13.0%	19.7%	12.4%	8.2%

Source: U.S. Census Bureau, 1990

5.1.1.2 Housing

The residential character of the project area is composed of single-family, older homes on small lots, small cohesive, enclave neighborhoods, and several multi-family residential developments. The multi-family dwellings in the project area include duplexes, apartment complexes, and townhouses.

Table 5-5 shows housing trends for the project area and the city of Detroit. The project area lost more than 26 percent of its housing stock between 1980 and 1990. This is higher than the 13 percent decline in housing stock in Detroit. The higher decline in housing within the project area, compared with the city, may reflect the substantial decline in the area's population (a 32.5 percent decrease) from 1980 to 1990. The project area contains almost 5 percent of the housing units in Detroit.

Table 5-5
1980 and 1990 Number of Households

Location	1980	1990	Change
Project Area	26,987	19,853	-26.4%
Detroit	471,412	410,027	-13.0%
Wayne County	824,872	780,535	-5.3%
Michigan	3,195,213	3,847,926	20.4%

Source: U.S. Census Bureau, 1980 and 1990.

Selected housing characteristics for the project area, Detroit, Wayne County, and Michigan are shown in Table 5-6.

The project area has a higher percentage of renters than Detroit, Wayne County, and Michigan. Approximately 65 percent of the housing units in the project area are occupied by renters, compared to 47 percent in Detroit, 36 percent in Wayne County, and 29 percent in Michigan. The median value of owner-occupied units in the project area is similar to that of the city of Detroit: $24,500 and $25,600, respectively. These values are substantially lower than the median of $48,500 for Wayne County and $60,600 for Michigan. The median rental cost is lower in the project area ($299 per month) than in Detroit ($372 per month).

Table 5-6
Selected Housing Characteristics for Project Area, City of Detroit, Wayne County, and Michigan

Housing Characteristics	Project Area	Detroit	Wayne County	Michigan
Persons in Group Quarters	859	15,381	26,188	211,692
Percent Owner-Occupied Units	34.9%	52.9%	63.9%	71.0%
Percent Renter-Occupied Units	65.1%	47.1%	36.1%	29.0%
Median Value of Owner-Occupied Units	$24,500	$25,600	$48,500	$60,600
Median Monthly Rent	$299	$372	$406	$343
Percent Detached Units	41.9%	59.6%	65.8%	N/A
Percent Homeowner Vacancy Rate	N/A	1.1%	1.0%	1.3%
Percent Rental Vacancy Rate	11.8%	8.2%	7.5%	7.2%

Source: U.S. Census Bureau, 1990

Segment A of the project area has the largest concentration of multi-family units. Two large apartment and townhouse complexes are located in the northwest quadrant of the I-94/M-10 interchange: Research Park Apartments and Elijah McCoy Townhouses. Many of these multi-family units house students and faculty of nearby Wayne State University (WSU). In addition, many of the multi-family housing units provide housing for residents on fixed incomes.

Single-family houses are also located in this segment of the project area. Most of the single-family houses are modest in size and decoration. The Woodbridge Neighborhood Historic District is partially located in Segment A and includes many single-family houses. The Fourth Street neighborhood is in this segment and has single-family houses and multi-family units.

Of the three segments in the project area, Segment B contains the fewest residential units. The houses in this area are typically single-family houses on small lots. Many houses in this segment have been demolished or are vacant as a result of the population decline.

The highest concentration of single-family residential units is located in Segment C. Dense residential development is located north and south of I-94, extends beyond the eastern terminus of the project area at Conner Avenue. These houses tend to be slightly larger than the houses in Segment B and located on slightly larger lots.

5.1.1.3 Community Facilities and Services

The locations of community facilities and services and schools within the I-94 area are shown in Figures 5-2A, B, and C and 5-3A, B, and C, respectively. Some of the facilities shown on these figures are outside the immediate project area but are included to present a more complete picture of the communities and neighborhoods in the vicinity. These facilities and the services they provide enhance the quality of life of the residents by providing opportunities for recreation, worship, education, and community service and involvement. They are a part of the fabric of the community and help to define the community character.

Medical Facilities. Hospitals are located in each segment of the project area. The Henry Ford Hospital is located within Segment A, the Detroit Medical Center is located within Segment B, and the Samaritan Health Center is located within Segment C. The Detroit Medical Center is located on Woodward Avenue, serves the entire city of Detroit, and provides a children's hospital and other medical specialties. The WSU medical campus is a part of the Detroit Medical Center.

Police and Fire. The Detroit Police Department provides residents with protection and safety for communities in the project area. A Detroit Police Mini Station is within Segment A's Freedom Place Apartments located on Forest Avenue and the M-10 service drive. The 13th Precinct of the Detroit Police Department is located on Woodward Avenue and is the main police station serving neighboring communities and the entire project area. Detroit fire and police stations serving the area are shown in Figures 5-2A, B, and C.

Libraries. The Main Branch of the Detroit Public Library is located on Woodward Avenue. Smaller branches are located on Gratiot Avenue (Mark Twain Library) in Segment C and on Grand Boulevard (Duffield Branch) in Segment A. The Detroit Public Library Bindery Service Shop is located in Segment A near the M-10 interchange.

Schools. There are 20 high school/adult education/vocational schools, 25 elementary schools, and 5 middle schools within 1 mile of I-94 in the project area (Figures 5-3A, B, and C). Specialized schools, such as a performing arts school, a foreign language immersion school, and a school for the hearing impaired, are also located within the project area.

Additionally, the project area contains facilities of higher education. The campus of WSU is located near I-94 and M-10 and provides four-year undergraduate degrees, graduate degrees, and law and medical degrees. Wayne County Community College is located near Conner Avenue in Segment C. It is a two-year college offering an associate's degree. It also has various technical and vocational programs.

Churches. Several churches of various denominations are located in and near the project area (Figures 5-2A, B, C). The churches are a vital part of the neighborhoods and communities. They function as social centers and are important in neighborhood communication and organization.

Community Groups. The many community-based groups in the project area include citizen district councils, business associations, neighborhood associations, church groups, and other organizations such as Warren/Conner Development Coalition. The groups help maintain cohesive communities within the project area. These groups helped identify the needs of their respective constituents and articulated the needs to the study team.

Citizen District Councils (CDCs) provide a voice for the local community on redevelopment projects, plans for business and commercial development, and related activities. Council members serve as advocates for area residents and as liaisons with city agencies. CDCs are officially recognized sub-units of city government but have community autonomy.

5.1.1.4 Non-Motorized Mobility

According to the 1995 project area survey, 24 percent of the population in the project area do not own a vehicle. Many of the residents walk or bicycle to reach businesses in the neighborhood, places of employment, bus stops, churches, schools, and other community facilities. Pedestrian and bicycle movements take place both within the neighborhoods and across I-94 on pedestrian/bicycle bridges.

In 1995, pedestrian and bicycle use was surveyed in the area of the I-94 Rehabilitation Project. Most pedestrian and bicycle activity in the project area was in the WSU area. The pedestrian and bicycle activities occur within the WSU campus and on major streets leading to the campus area, such as Woodward, Cass, and Warren avenues, and Anthony Wayne Drive. Pedestrian and bicycle counts for pedestrian and vehicular bridges over I-94 were taken for three time periods in the middle of a week in June 1995. The most heavily used bridge was the Cass Avenue bridge that accesses the WSU area. This area had the highest pedestrian and bicycle traffic in the project area. The areas with the next

highest concentrations of pedestrian and bicycle movements are in vicinities of schools located outside of the WSU area.

Pedestrian activities are also concentrated around major bus stops. The locations of the bus stops and transit routes traversing the project area are shown in Appendix D.

5.1.1.5 Neighborhood/Community Character and Cohesion

The project area is within the city of Detroit. According to 1990 Census data shown earlier in this chapter, the community within the project area is a minority community with a larger percentage of African American residents, more renters, and lower incomes than the city of Detroit or Wayne County.

Many of the residential areas are mixed with commercial uses, and large areas of industrial use are located adjacent to I-94. The housing in the area is generally older wooden frame houses and masonry multiple-family dwellings. In some areas, some structures are vacant and/or abandoned and not maintained. Vacant lots, where houses have been, are interspersed with occupied lots.

Neighborhood cohesion refers to the physical and social integrity of a neighborhood or a community. The communities in the project area were split by I-94 when the interstate was constructed in the 1950s. Residents were relocated to other areas and separated from neighbors. I-94 created a physical barrier that divided communities and made social interaction between the two sides of the interstate difficult. I-94 became a boundary of communities, and over time, neighborhoods and contiguous communities with social integrity developed on either side of I-94.

Cohesive neighborhoods, such as the Fourth Street neighborhood and the Woodbridge neighborhood, exist within the project area. Neighborhood business organizations are also located in the project area. The residential and business neighborhood organizations are dedicated to preserving and improving their neighborhoods. Their activities include communications within neighborhoods, clean up, beautification, assistance for senior citizens, renovation of buildings, and other community activities. The organizations demonstrate commitment to their neighborhoods and contribute to community cohesion.

The Fourth Street neighborhood is a small residential area in the northeast quadrant of the I-94/M-10 interchange. It contains approximately 15 to 20 structures, mainly single-family houses and a small apartment building. Many of its residents have lived in the neighborhood since the 1970s and voice a strong sense of community pride. Fourth Street neighborhood residents have stated that their neighborhood is culturally and socially unique.

Development of the New Center area, north of I-94 in the vicinity of Woodward Avenue began in 1919 when the General Motors offices were constructed. The area is a mixture of businesses, residences, and health facilities. New Center has redevelopment plans that

include residential and commercial development. A strong area council exists and supports the cohesion of the area.

The WSU area has new commercial development, health facilities, housing, and educational structures. The Wayne State Master Plan includes development of a research facility and a sports arena. The businesses in the area have a strong business organization, while the university community exhibits the cohesion of an educational facility.

The Woodbridge Neighborhood Historic District is located southwest of the I-94/M-10 interchange. The historic nature of the neighborhood is a basis for neighborhood organization and uniqueness. A few neighborhood businesses provide retail services to the neighborhood.

The University Cultural Center is a developing community south of Wayne State University. The Detroit Institute of Arts and the Charles Wright African American Museum serve as a focal point for the area. Businesses, churches, and residences are also located in the University Cultural Center and the residents and businesses of the area form a distinct community.

5.1.2 Impacts to the Social Environment

5.1.2.1 Acquisition Impacts

The number of housing structures that would be acquired for construction of the Build Alternative is based on conceptual design. To estimate the number of persons to be displaced, the average number of persons per household in the project area (2.6 persons per household) was multiplied by the number of housing structures to be acquired.

No-Build Alternative and Enhanced No-Build Alternative. The No-Build and Enhanced No-Build alternatives would require no right-of-way acquisition or residential displacements.

Build Alternative. The Build Alternative minimizes the number of acquisitions and displacements. Initial alternatives evaluated would have required the acquisition of Research Park Apartments and the Fourth Street neighborhood and displaced approximately 750 residents. After redesign and refinement of the Build Alternative because of public comment and MDOT and city of Detroit concerns, the number of displacements decreased by approximately 620 residents. Based on current conceptual design, the Build Alternative would displace approximately 133 residents.

Although the current Build Alternative design concept does not require acquisition of the entire Fourth Street neighborhood as the original alternatives did, at least two structures would be acquired.

The Build Alternative would require right-of-way acquisition and displacement of residents (Appendix E). Table 5-7 provides information on the number and type of structures that would be acquired with implementation of the proposed Build Alternative. The numbers are approximate and based on conceptual design. Final design, final determination of impacts to residences, and coordination with residents would determine the actual number of acquisitions and displacements.

In addition to acquiring structures, the Build Alternative would require acquisition of some partial pieces of property adjacent to the freeway. Final design would determine the location and amount of right-of-way required.

Table 5-7
Estimated Number of Structure Acquisitions and Displacements
Build Alternative

Type of Property	Estimated Number of Acquisitions	Estimated Number of Persons to be Relocated
Apartments	2 Structures (14 Units)	36
Single Family	27 Structures (27 Units)	71
Duplexes	5 Structures (10 Units)	26
Businesses	15 Structures (15 Units)	NA
Nonprofit Organizations	3 Structures (3 Units)	NA
Total	52 Structures (69 units)	133

NOTE: "NA" stands for "not applicable."

5.1.2.2 Displacement Impacts

Persons who reside in structures to be acquired would be relocated to other housing. Persons who depend upon either walking or riding the bus to attend church, to shop, or to access medical facilities and care would be impacted if they were relocated farther away from bus service or community facilities. Elderly persons who have lived in housing for decades may have an emotional attachment to the housing as well as the neighborhood and would be impacted if relocated.

During public involvement meetings, some community members commented that they had been relocated to the project area after they were displaced for construction of other Detroit transportation facilities.

Those who remain in the community could experience social impacts such as the loss of friends, neighbors, church members, or classmates. Members of the community could also lose some businesses that they patronize.

5.1.2.3 Impacts to Community Facilities and Services

No-Build Alternative and Enhanced No-Build Alternative. The No-Build and Enhanced No-Build alternatives would have no direct, short-term impacts on community facilities and services. However, the No-Build and Enhanced No-Build alternatives would not improve access to community facilities and services.

Opportunities for improved transit and mobility to more easily access facilities and services would not be added to the I-94 corridor. The current lack of sidewalks inhibits pedestrian traffic within the communities.

The Enhanced No-Build Alternative would rebuild the pedestrian and vehicular bridges in existing locations with no opportunity to enhance pedestrian access within the community. No continuous service drives with adjacent sidewalks would be constructed.

Emergency vehicle access to medical facilities via continuous service drives would not be improved.

Build Alternative. The Build Alternative would add sidewalks adjacent to the service drives along the length of I-94. The result is a positive impact for pedestrians and bicyclists. The Build Alternative would provide opportunities for improved transit service and mobility within the project area. Reconstructed vehicular bridges, continuous service drives, and decreased congestion would reduce response time for emergency vehicles.

Because of the increased width of the mainline, the Build Alternative would require longer bridges. An impact would result for the elderly or other users if they have difficulty walking.

Medical Facilities. The No-Build and Enhanced No-Build alternatives would not improve access by emergency vehicles to medical facilities. The Build Alternative would improve local circulation and provide better access via the continuous service drives.

Police and Fire. The No-Build and Enhanced No-Build alternatives would not improve police and fire operations and emergency response times. The Build Alternative would improve response times for emergency vehicles because of decreased congestion and improved access.

Libraries. The No-Build and Enhanced No-Build alternatives would not improve pedestrians and bicyclists access. The Build Alternative would provide sidewalks on vehicular bridges. Community members who rely on the pedestrian bridges to access the libraries and who would have farther to walk might be impacted. The Build Alternative

would construct pedestrian facilities to enhance community access to the libraries and so would have a beneficial impact.

The Detroit Public Library Book Bindery Service would be acquired and relocated if the Build Alternative is the Recommended Alternative. If eligibility criteria were met, the service would qualify for functional replacement. The bindery service would be relocated in coordination with the library administration.

Schools. The No-Build and Enhanced No-Build alternatives would not improve access to the schools. The Build Alternative would construct sidewalks to enhance community access to the schools and so would have a beneficial impact.

The Build Alternative would affect a small grassy area along the service drive in front of the Catherine C. Blackwell Institute of International Studies, Commerce, and Technology. The existing service drive, a sidewalk, and approximately 20 feet of a small grassy area would be acquired to accommodate the proposed improvements. The continuous service drive would be located approximately 40 feet from the front of the building. This impact would not affect students or faculty.

No other schools would be affected by acquisition for construction of the Build Alternative.

Community Cohesion. The No-Build and Enhanced No-Build alternatives would not divide neighborhoods or affect social integrity. The Build Alternative would affect the edges of neighborhoods adjacent to I-94 by acquisition of some residences. Although the Build Alternative would not split neighborhoods or communities, it would require the relocation of some residents from the edges of communities along I-94.

The Build Alternative reduces the number of displacements that were displaced by the previously considered build alternatives, but would still require relocation of some community members. Depending upon residents' involvement and places in the community, the social integrity of the neighborhoods would be impacted to various degrees through loss of residents.

On both sides of I-94, some neighborhoods and communities are being revitalized or have plans for redevelopment. The beneficial impacts of enhanced access and improved aesthetics of the Build Alternative would facilitate revitalization and would contribute to the revitalization and integrity of the communities.

Community Groups. The No-Build and Enhanced No-Build alternatives would not result in impacts to community groups because of loss of members who would be relocated. The Build Alternative might result in loss of group members who are relocated.

Traffic Impacts to Neighborhoods. Neighborhood traffic with either the No-Build or the Enhanced No-Build alternative would continue as it currently exists.

The Build Alternative would enable vehicles on service drives to try to avoid signals or take short cuts through neighborhoods on local streets. Increased traffic and noise would result. During public meetings, community members commented that increased non-local traffic would be undesirable.

5.1.2.4 Non-Motorized Mobility

No-Build Alternative. The No-Build Alternative would neither enhance nor detract from pedestrian or bicyclist mobility. The No-Build Alternative would retain the opportunity that currently exists for improved transit to enhance mobility for those who do not have vehicles.

Enhanced No-Build Alternative. The Enhanced No-Build Alternative would include review of the locations of deteriorating bridges and replacement of them if the amount of use warrants replacement. The Enhanced No-Build Alternative would retain the existing opportunities for improved transit to enhance mobility for those who do not have vehicles.

Build Alternative. The proposed Build Alternative would have a positive impact on pedestrians. Pedestrian bridges and vehicular bridges would be consolidated where feasible. Pedestrians would use sidewalks provided on the vehicular bridge. A minor effect would occur for those who would have to travel farther if the consolidation results in a longer route to the bridge. After further design and determination of consolidations and locations of pedestrian bridges, community members would have the opportunity to comment.

The Third Street bridge would be removed for the Build Alternative. Fourth Street neighborhood pedestrians and bicyclists would use the Second Street bridge to access WSU. This would add two blocks to the walk.

The provision of three-lane continuous service drives with sidewalks for the Build Alternative, particularly in areas without existing service drives, would have a beneficial impact.

The Build Alternative would provide continuous service drives and reserved median space that would facilitate future transit options.

5.1.3 Mitigation of Build Alternative Impacts to the Social Environment

5.1.3.1 Mitigation of Acquisitions

The number of structure acquisitions required as a result of the Build Alternative was minimized through a variety of measures. For instance, retaining walls, which require

less right-of-way and fewer acquisitions of structures, would be used. In addition, the Build Alternative was refined and redesigned to avoid acquisition of the high-rise tower of the Research Park Apartments and most of the Fourth Street neighborhood.

Property would be acquired in compliance with state and federal guidelines and laws for right-of-way acquisition.

5.1.3.2 Mitigation of Displacements

Any person, family, business, or non-profit organization displaced by the proposed project would be offered assistance in locating a suitable replacement property. Those relocated would be assisted by the MDOT Real Estate Division and in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Federal Public Law 91-646). The Act establishes "a uniform policy for fair and equitable treatment of persons displaced as a result of federal or federally assisted programs in order that such persons shall not suffer disproportionate injuries as a result of programs designed for the benefit of the public as a whole." The state of Michigan also has laws that govern relocation. MDOT provides an explanation of procedures and benefits in the booklets *Your Rights and Benefits when Displaced by a Transportation Project* and *Public Roads and Private Property.* These booklets are available without charge to those affected by the project.

Currently, comparable housing and commercial properties to rent or buy are available in the project area. It is likely that properties will be available in the future when persons are relocated.

5.1.3.3 Mitigation of Traffic Impacts to Neighborhoods

During design of the Build Alternative, measures to discourage non local traffic in individual neighborhoods would be evaluated in coordination with neighborhood residents. Among measures would be speed humps, right-in only or right-out only turns from service drives to local connecting streets, or cul-de-sacs on connecting streets.

5.1.3.4 Mitigation of Other Impacts to the Social Environment

Prior to final design, residents of the area would have the opportunity to comment on proposed removal and replacement of pedestrian bridges and new patterns of non-vehicular travel.

5.1.4 Title VI of the Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964 requires federal agencies to ensure that no person on the grounds of race, color, or national origin is excluded from participation in, denied the benefits of, or subjected to discrimination under any program or activity receiving federal financial assistance. A proposed project that has the potential for

disproportionately high and adverse effects on populations protected by Title VI should only be carried out if:

(1) A substantial need for the project exists, based on the overall public interest; and
(2) Alternatives that would have less adverse effects on protected populations have either:
    (a) Adverse social, economic, environmental or human health impacts that are more severe; or
    (b) Would involve increased costs of an extraordinary magnitude

The Build Alternative has the potential for disproportionately high and adverse impacts, but satisfies the purpose of and need for the proposed project, and construction of the proposed project would be in the overall public interest. See Section 5.1.3 for mitigation of these impacts. Relocating I-94 to a new location would result in more severe impacts, such as larger numbers of persons displaced and loss of community cohesion in neighborhoods split, than the proposed Build Alternative. Therefore, the proposed project is in compliance with Title VI of the Civil Rights Act of 1964.

5.1.5 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued February 11, 1994. The executive order requires federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. Identifying and addressing disproportionately high and adverse effects on protected populations requires identification of minority groups and persons living below the poverty level. It also requires determination of the potential for the action to have disproportionate effects on these populations.

The United States Department of Transportation (DOT) and the Federal Highway Administration (FHWA) issued orders to address Executive Order 12898. The DOT and FHWA orders outline how environmental justice analyses should be performed and how transportation project decisions should be made to avoid disproportionately high and adverse effects on minority and low-income populations. The DOT requires agencies to (1) explicitly consider human health and environmental effects related to transportation projects; and (2) implement procedures to provide meaningful opportunities for public involvement to members of low-income and minority populations during project planning and development.

5.1.5.1 Disproportionately High and Adverse Effects on Minority and Low-Income Populations

Disproportionately high and adverse effects on minority and low-income populations means any adverse effect that:

(1) Is predominately borne by a minority population and/or a low-income population; or

(2) Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

Minority and Low-Income Populations. To determine if minority or low-income populations exist in the project area, 1990 U.S. Census data were examined. The Population Characteristics subsection of the Social Impacts section of this DEIS describes the racial and income characteristics of the census tracts in the project area. Census statistics identify both a minority population and a low-income population in the project area adjacent to I-94. The population is 87 percent African American. The average per capita income in the project area is approximately two-thirds that of the average per capita income in the city of Detroit and approximately one-third of the average Michigan per capita income. Low-income is defined as income below the federal poverty level. The 1989 poverty level was $9,885 for a family of three. Of the population of the project area, 40 percent has an income below the federal poverty level compared to 32 percent of the population of the city of Detroit and 13 percent of the population of the state of Michigan.

Potential Impacts to Minority and Low-Income Groups. This DEIS has examined the physical and social environment of the project area and identified potential environmental impacts of the proposed project. Detailed descriptions of the potential impacts are described above in Section 5.1.2, Impacts to the Social Environment. A summary follows.

Several alternatives were developed and considered early in the I-94 Rehabilitation Project study. They are described in Chapter 4.

The three Practical Alternatives that are considered in this DEIS for the I-94 Rehabilitation Project are:

- No-Build Alternative
- Enhanced No-Build Alternative
- Build Alternative

The Build Alternative would adversely affect the minority and low-income population of the project area. The potential impacts of the I-94 Rehabilitation Project include:

- Acquisition of property
- Relocation of residents to other neighborhoods
- Loss of community businesses
- Increase in traffic at new service drive locations
- Construction impacts, such as noise and additional traffic

Based on the above impacts of the Build Alternative, the minority and low-income population of the project area would experience disproportionately high and adverse environmental effects.

5.1.5.2 Actions to Address Disproportionately High and Adverse Effects

The FHWA, in its order to address environmental justice, sets forth actions to address disproportionately high and adverse effects that result from a proposed project. The public should be provided public involvement opportunities for comment and meaningful access to public information concerning environmental impacts. When it is determined that a project will have disproportionately high and adverse effects on minority and low-income populations, mitigation and enhancement measures and potential offsetting benefits to the affected minority or low-income population should be taken into account. Factors should include design and comparative impacts. The proposed project should only be carried out if further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effects are not practicable. The social, economic, and environmental effects of avoiding or mitigating the adverse effects should be taken into account.

I-94 is an existing facility. Avoidance of impacts to the identified I-94 project area minority and low-income groups would require construction of a new freeway away from the affected population or a No-Build alternative would have to be selected.

Reconstruction of I-94 on a new location would result in more severe impacts than the proposed Build Alternative. No undeveloped corridor exists in or around Detroit in which a facility could be constructed with fewer displacements and/or less social disruption. The urbanized character of Detroit and southeastern Michigan would preclude the construction of a new freeway without newly dividing communities or displacing more residents than the proposed Build Alternative. The minority population of Detroit is 76 percent, and it is 40 percent in Wayne County. Any construction of I-94 on a new location would likely adversely impact a minority population. In addition, a proposed alternative on a new location would result in greater cost because of new right-of-way acquisition.

Rehabilitating and widening existing I-94 would result in displacements on the edges of communities along the facility. While the proposed Build Alternative would result in social impacts to residents displaced and to those remaining, the impacts would be fewer and of less magnitude than if a new facility were to be constructed on a new location.

The No-Build and Enhanced No-Build alternatives would avoid the impacts of the Build Alternative but would not provide:

- Access to neighborhoods to facilitate new development
- Aesthetic improvements, such as landscaping
- Service drives that would facilitate improved transit
- Sidewalks

Implementation of the Build Alternative would result in some beneficial impacts, including:

- Improved access to some neighborhoods
- The opportunity for improved transit

- Sidewalks adjacent to service drives for pedestrians
- Landscaping
- Improved freeway aesthetics

Public Involvement. An extensive public involvement program was developed and implemented as an integral part of the project. The purpose of the public involvement program was to establish and maintain communication with the public and various affected or interested agencies. See Chapter 8 for a detailed discussion of ongoing public involvement, comments received, and responses. The public involvement program includes formal scoping meetings and informal presentations to a wide range of organizations, agencies, and individuals (See Appendix G). A few examples are listed below.

- Two public scoping meetings in August 1995 in different locations within the project area
- A Citizens Advisory Committee (CAC)
- Interagency Coordination Committee (ICC) meetings to develop and evaluate the alternatives
- A telephone survey in September 1995 that polled more than 450 residents and businesses located within 1 mile of I-94
- A project office and toll-free number
- Eight general public information meetings to present project status and proposed alternatives
- More than 100 meetings with local institutions, business associations, neighborhood councils, and other local organizations
- Continued coordination with the city of Detroit that is committed to enhancing the Detroit urban environment and improving conditions for its citizens

During the extensive public involvement process, alternatives have been revised to reflect concerns expressed by neighborhoods. Comments on alternatives and appropriate options were used to modify or eliminate alternatives. The Build Alternative was revised and refined a number of times to eliminate acquisition of the Research Park Apartments and the Fourth Street neighborhood and reduce the amount of right-of-way needed. The Practical Alternatives, the subject of this DEIS, were selected based on their ability to satisfy the project's purpose and need, goals and objectives, and community input, and to minimize the project's social, economic, and environmental impacts.

5.1.5.3 Offsetting Benefits, Mitigation, and Reduction of Impacts

Offsetting benefits of implementation of the proposed Build Alternative would include improved access, opportunity for improved transit, and the addition of sidewalks. To reduce potential displacement impacts, the design of the Build Alternative uses retaining walls to reduce the amount of right-of-way and acquisitions required. The Build Alternative was further refined to avoid acquisition of the Research Park Apartments and the Fourth Street neighborhood and to reduce the number of displacements. Mitigation in the form of landscaping, sidewalks, and improved freeway aesthetics would be included in the project. Those displaced would be relocated to decent, safe, and sanitary housing

with assistance from the MDOT Real Estate Division and in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. More information about how this would be accomplished is contained in Section 5.1.3.1, Mitigation of Displacements.

5.2 Economic Environment

Although this section describes the local economy within the corridor, it is recognized that this local economy is tied to regional, national, and global economies. Southeast Michigan, uniquely positioned around the I-94 corridor, plays an important role in the shipment of goods from major European ports through Canada to Chicago where they are distributed to other parts of the United States. The United States and Canada represent the world's largest trading partnership. In 1994, the value of trade between the U.S. and Canada was an estimated $1 billion per day (SEMCOG, 1997). The I-94 corridor plays an important role in the growing NAFTA-inspired trade volumes between the Mexican, U.S. (particularly Michigan), and Canadian auto industries.

I-94 connects the Michigan interstate system to the busiest border crossings in North America. It also links four regional airports in southeast Michigan. Through I-94, the economics of the state of Michigan, southeast Michigan, and the city of Detroit are linked together. While I-94 provides a critical link for international trade that flows from Europe and Canada, it also serves local traffic that accesses many of the commercial, cultural, and institutional centers in the city of Detroit.

5.2.1 Existing Economy

Businesses within the project area cater to diverse groups of residents, commuters, and other surrounding establishments. There are no large concentrations of businesses within the project area. Strip commercial developments front the major thoroughfares such as West Grand Boulevard and Warren, Van Dyke, Harper, and Gratiot avenues.

Near the I-94/M-10 interchange is the University Shopping Plaza that provides the surrounding community with a grocery store, a sandwich shop, a hair salon, and other goods and services. Segment B residents rely largely on corner community stores that provide basic groceries and necessities. Segment C residents are able to choose from many more establishments along Van Dyke and Harper avenues. Larger chain grocery stores are located in this segment.

WSU is located in Segment A and is a major employer and contributor to the economy of the area.

Industries are concentrated around the northeast portion of the M-10 interchange and the I-75/Conrail interchange. Industries are also concentrated along Piquette Avenue and Trombly Street and include Detroit Edison, Michigan Box Company, and Fontana Forest Products Company. The General Motors Cadillac Plant is located on the north side of I-94 and spans several city blocks. Other industries are located in Segment C.

The city of Detroit, public and private institutions, and community groups are actively pursuing numerous development projects in and adjacent to the project area.

The project area traverses several segments of Detroit's Empowerment Zone, as shown in Figures 5-4A and 5-4B. The Empowerment Zone, which was designated by the Secretary of the U.S. Department of Housing and Urban Development, is an area targeted for federal and local development assistance. It is a new approach to urban revitalization. To improve the quality of life for residents, the city of Detroit will receive federal grants in the form of tax breaks and other incentives to entice businesses to relocate or expand within a specified geographic area. Also, the state of Michigan implemented Renaissance Zones in late 1996. They are established zones that are intended to stimulate investment in largely industrial areas by virtually eliminating all state and local taxes for businesses and residences located in these zones. There are three Renaissance Zones along the rehabilitation corridor, one of which is also designated as an Empowerment Zone. The Renaissance Zones within the I-94 rehabilitation corridor are also shown in Figures 5-4A and 5-4B. The 1990 census indicates that there are approximately 15,100 people employed within the census tracts in the project area. The highest numbers of employees are in health services and retail trade. These two classifications combined with manufacturing and educational services, the next highest employers, comprise approximately two-thirds of the types of employment represented in the project area. This indicates a heavily service-oriented economy that is typically dependent on accessibility by cars and trucks. Table 5-8 summarizes 1990 employment by industrial class in the rehabilitation corridor.

5.2.2 Impacts to the Economy

5.2.2.1 No-Build Alternative

The No-Build Alternative would require the expenditure of money for maintenance and repairs with no improvements to traffic operations. Although no direct impacts would result, the No-Build Alternative would not facilitate development or revitalization and in the long term would impact the economy. It would not facilitate freight movement, which would result in an economic impact.

5.2.2.2 Enhanced No-Build Alternative

The Enhanced No-Build Alternative would include reconstruction of the freeway with ramps and auxiliary lanes, reconstruction of bridges and interchanges, and replacement of pedestrian bridges, but no additional driving lanes or improved interchanges. Money would be spent with a greater return in improved transportation than for the No-Build Alternative, but congestion would continue to occur. Freight movement would not be enhanced.

Table 5-8
1990 Employment by Industrial Class in the Project Area

Industrial Class	Employment	Percentage of Total
Agriculture, Forestry, Fisheries	157	1.0 %
Mining	11	0.1 %
Construction	380	2.5 %
Manufacturing, Non-durable Goods	402	2.7 %
Manufacturing, Durable Goods	949	6.3 %
Transportation	420	2.8 %
Communications, Public Utilities	345	2.3 %
Wholesale Trade	420	2.8 %
Retail Trade	2,763	18.3 %
Finance, Insurance, Real Estate	878	5.8 %
Business, Repair Services	785	5.2 %
Personal Services	539	3.6 %
Entertainment/Recreation Services	266	1.8 %
Health Services	3,721	24.6 %
Educational Services	1,712	11.3 %
Other Professional Services	883	5.8 %
Public Administration	463	3.0 %
Armed Forces	11	0.19 %

Source: U.S. Census Bureau, 1990

5.2.2.3 Build Alternative

The Build Alternative would result in the beneficial impacts of enhanced access to businesses in the project area and construction jobs and money added to the local economy. The cost of the proposed project is found in Chapter 4.

The primary impacts of the proposed Build Alternative on the local economy are associated with the direct effects of right-of-way acquisitions and the resulting relocations of businesses and employees.

The proposed Build Alternative would require acquisition of property and displacement of residents and businesses. The estimated numbers of residential and non-residential properties that would be displaced are shown in Table 5.7. These estimates are based on conceptual design information and include partial property acquisitions. If the Build Alternative is selected as the Recommended Alternative, these estimates are subject to change because more specific limits of construction would be identified during final design of the project.

Businesses relocated some distance away from their original locations would have to re-establish a customer base and could lose money temporarily. A total of five businesses are proposed to be acquired. The number of businesses to be displaced is small in

comparison with businesses that will remain in the area. The effect to the economy would be small.

Property tax revenues would be reduced slightly (approximately 0.6 percent) as a result of right-of-way acquisitions for the Build Alternative. It is expected that as the area redevelops, the property tax revenues would be regenerated.

The Build Alternative would improve access to and the aesthetics of the surrounding neighborhoods to facilitate redevelopment. Redevelopment areas, such as New Center, would benefit.

Congestion relief would be a beneficial impact for transporters of goods, both for local and interstate trade. Less congestion would result in travel-time savings and permit faster and safer transport.

During construction of the proposed Build Alternative, access to businesses would become more difficult and some loss of revenue could result. This would be a temporary impact.

5.2.3 Mitigation of Build Alternative Impacts to Economic Conditions

Several meetings were held with the business community to review the purpose and need of the proposed project and to receive comments and suggestions related to the project. Changes have been made to the proposed alignments to reflect comments from the business community. For example, the modification of the project scope (described in Chapter 3) to include the M-10 and I-75 interchanges and the use of retaining walls were, in part, a result of input from the business community. MDOT would continue to work with the business community and the city of Detroit to mitigate impacts of the proposed project.

The Build Alternative is a modification of the original Continuous Service Drives and Braided Ramp alternatives and was designed to avoid acquisition of the Research Park Apartments and the Fourth Street neighborhood. These refinements saved expenditure for the cost of structures and relocation of residents.

After a Recommended Alternative is selected, a more detailed assessment would be performed to determine the characteristics of patrons of businesses affected by construction or displacement. This assessment would enable MDOT to take actions to mitigate impacts that would affect the viability of the businesses.

Industrial or commercial properties would be acquired in conformance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Federal Public Law 91-646). Businesses and non-profit organizations are eligible for actual reasonable moving costs and related expenses.

MDOT has developed a Conceptual Stage Relocation Plan for the project area to analyze the potential displacements within the area if the proposed Build Alternative is implemented. The plan is found in Appendix F.

5.3 Land Use

5.3.1 Existing Land Use Conditions

Existing land use within the project area conforms to city of Detroit zoning ordinances and land use policies. Figures 5-5A, B, and C illustrate the project area land use.

Land use in the project area is primarily mixed residential and industrial, with scattered commercial sites along the corridor. Kettering High School, Wayne County Community College, and Wayne State University are located along the south side of I-94. The General Motors Detroit and Hamtramck Assembly Plant is located between I-75 and Mt. Elliott Avenue north of I-94. Approximately 60 percent of the I-94 corridor between I-96 and I-75 is residential land use. Industrial facilities compose 30 percent of the area, while commercial development is sparse. A large apartment complex, Research Park Apartments, is located northeast of the I-94/M-10 interchange. WSU is located immediately south of the I-94/M-10 interchange.

Between I-75 and Mt. Elliott Avenue, land use on the north side of the freeway is almost entirely industrial. The General Motors Detroit and Hamtramck Assembly Plant occupy most of the land area to the north in this area. Land use south of I-94 is predominantly residential, with sparse commercial locations.

From Mt. Elliott Avenue to the end of the proposed project near Conner Avenue, land use is mostly residential, with limited commercial establishments. The area between Van Dyke Avenue and just past French Road is almost entirely residential on both sides of the freeway. Kettering High School is located immediately south of I-94, just west of the I-94/Van Dyke Avenue interchange. Wayne County Community College is southwest of the I-94/Conner Avenue interchange. Industrial facilities compose the remaining land use in this area.

Along M-10, the land use is composed primarily of residential and commercial properties. Several apartment buildings are located on the north side of Forest Avenue, east and west of M-10. Wayne State University is located along the west side of M-10, between Warren Avenue and I-94. St. Andrews Church is also located on the campus next to M-10. Almost all of the land on the east side of M-10 between Kirby Avenue and Milwaukee Avenue is used for parking. Townhouses are located on the northwest corner of the I-94/M-10 interchange and a hospital is on the west side of M-10 and north of West Grand Boulevard. The remaining land west of M-10 is commercial.

Along I-75, much of the land is residential south of I-94 and commercial to the north. Development includes apartments on the east side between Forest Avenue and Canfield Avenue and two churches. A juvenile detention center is north of Forest Avenue and the

Detroit Department of Transportation is located between Warren Avenue and Ferry Street. The land area north of I-94, between West Grand Boulevard and I-94, is either commercial or vacant. A church, the Michigan Humane Society, and homes are located to the north of Custer Avenue and two schools are between Clay Avenue and Euclid Avenue. Homes are also located north of Clay Avenue on the east side.

Land Use Policy. The I-94 project area is located entirely within the city of Detroit. Land use in Detroit and adjacent to I-94 follows the policies put forth in *the Detroit Master Plan of Policies* (1990). The city zoning ordinance implements the master plan. The master plan is currently being revised and will implement *A Framework for Action* (1995). The Mayor's Land Use Task Force published *A Framework for Action* (1995), a report that discusses land use strategies and makes recommendations for more livable communities in the city of Detroit. Although it is not a definitive plan for land use or economic development, it describes a vision for what the city can become and provides general guidelines to evaluate land use and project development proposals. Figure 5-6 provides a summary of land use recommendations.

A Framework for Action makes several recommendations including coordinating the rebuilding of I-94 with policies for future land use. Therefore, the reconstruction of I-94 is consistent with the framework. It is stated in the framework that the rebuilding of I-94 would provide opportunities for retaining and attracting business and improving access to jobs and services.

The report identifies the rehabilitation of I-94 within the city limits as a determining factor in achieving its redevelopment goals in the area. Therefore, the proposed project conforms to land use and transportation plans and guidelines established for and by the city of Detroit.

Since the completion of *A Framework for Action*, ten "cluster reports" have been written as part of the Detroit Community Reinvestment Strategy strategic planning process. The clusters within the project area are shown on Figure 5-7. Cluster Reports 1, 3, 4, and 6 include the project area. The reports list land use recommendations that promote community-wide planning within the city. The major recommendations for each cluster report within the study corridor are summarized below:

Cluster Report 1: Improve mass transportation; coordinate with communities; sell bus tokens; maintain area as primarily a single-family neighborhood; improve bus service; increase commercial development that provides basic goods; restrict truck traffic from neighborhoods from 9 AM to 5 PM; and rehabilitate or infill areas along I-94.

Cluster Report 3: Provide well-lit bus shelters; more bus service; more retail along major thoroughfares; I-94 and I-75 good areas for cluster development; less truck traffic in residential areas; improve design and signage at bus stops; prohibits through traffic in neighborhoods; and Warren Avenue, Conner Avenue, and St. Jean Street are identified as preferred truck routes during I-94 construction.

Cluster Report 4: More bus service with reduced travel times; shuttles; pedestrian and bike paths to Woodbridge Neighborhood Historic District area; rehabilitation or infill along I-94; a desire to be involved in public participation process for the I-94 plans.

Cluster Report 6: Four historic districts; desire to strategically develop parcels along new service drives for the I-94 reconstruction and improve access through the redesign of I-94; more office parks; and upgrade or expand Henry Ford Hospital.

Cluster Reports 3 and 6 are also within the designated state of Michigan Renaissance Zones, areas designated to stimulate investment in primarily industrial areas. The I-94 project is consistent with these recommendations. Many of the recommendations from the cluster reports include the reconstruction of I-94.

5.3.2 Impacts to Land Use

5.3.2.1 No-Build and Enhanced No-Build Alternatives

With the No-Build and Enhanced No-Build alternatives, it is anticipated that current land use patterns would continue. Neither would facilitate redevelopment and revitalization of neighborhoods.

5.3.2.2 Build Alternative

Construction of the Build Alternative would support existing land uses and the implementation of future land use recommendations. Any changes in land use would be required to conform to the city zoning ordinance. The Build Alternative would provide improved mobility and access to land uses along the rehabilitation corridor and encourage the redevelopment of areas along I-94 by improving access and aesthetics.

The Build Alternative would serve proposed residential development in the project area by providing an improved major transportation link to employment, shopping, recreation, and health care opportunities in a more efficient manner, while relieving traffic congestion on existing roadways. In addition, planned development with broader market areas would be attracted to the area, eventually expanding the region's economic base. In summary, the Build Alternative would have positive impacts on existing and future land uses.

5.4 Aesthetics and Visual Resources

5.4.1 Existing Conditions

National Environmental Policy Act (NEPA) regulations identify aesthetics as one of the components of the environment to be considered in determining the effects of a road project. Aesthetics refers to the visual elements of a project. Visual resources are defined by the FHWA as those physical features that constitute the visible landscape. Visual resources are those elements within an area that provide unique and interesting

views to residents, visitors, and others who may traverse the area. The urban environment of the project area dominates its visual quality. The regional landscape character is described to establish a reference for evaluating the visual impacts to the freeway and the project area.

5.4.1.1 Regional Visual Character

Detroit's industrial past and urban character are easily recognizable within the landscape. The topography is flat, with no distinct landforms or natural features. Urban elements include industrial, residential, commercial, and institutional elements, freeways and local roadways, utilities, and vacant land. Pavement, trees, shrubs, grasses, and weeds constitute the land cover within the region. No natural features interrupt the continuity of the urban environment. Billboards and large signs draw attention away from the skyline. There are a few dominant features that attract attention and contribute to the visual quality of the area. These features are notable for their historic character, such as the St. Stanislaus Roman Catholic Church complex, or for landscaping in an urban environment, such as the grounds of the General Motors Cadillac Plant. The freeway system is a major urban element contributing to, and/or impacting the visual character of the project area.

5.4.1.2 Viewers

Viewer group characteristics determine how a visual quality is evaluated. Viewers are categorized into groups based on activities, lifestyle, and/or purpose for being within the project area. Viewers of the freeway consist of residents who live near the project area and may overlook or be adjacent to the freeway, employees who use the freeway to reach work in the area, and travelers who pass through Detroit, travel to destinations within Detroit, or deliver goods. Residential viewers can be sensitive to change, and visual impacts usually increase as the highway nears private space. Employees who work in the area and travelers are generally less sensitive to changes in the visual environment. Travelers, both local and regional, focus on other vehicles, speed, efficiency, and safety.

All of the viewer groups are sensitive to changes in the visual environment, although each to a different degree. Sensitivity to change is generally proportional to the amount of "ownership" a group has for an area. Ownership refers to financial investment in the land or emotional investment in scenic quality.

5.4.1.3 Viewshed

To analyze visual resources in areas that would potentially be impacted, the "viewshed" of the project area was defined. A viewshed is the surface area visible to and from a given point or collection of points. The viewshed was determined based on the area's topography and land cover. Views from I-94, M-10, and I-75 are limited because these freeways are mostly below grade. The exception is east of I-75 where I-94 is elevated for a short distance and on elevated ramps at the I-75 and M-10 interchanges. From the below-grade freeways, overpasses, on- and off-ramps, concrete barriers, pedestrian bridges, streetlights, and signs, dominate the view. An occasional building is seen above

if it is close to the edge of the freeway. The viewshed of non-freeway elements is limited for the driver because of the attention required to maintain safe operation of a vehicle.

Views of the freeways from the project area are limited because the freeways are mostly below ground level. The overpasses of the main street system provide little indication that a freeway is below. Most of I-94 can be seen only from the edge of the freeway or from an overpass. Residents adjacent to I-94 may be able to see the facility from second- or third-story windows. The foreground, middle ground, and background elements in the viewshed blend together to form a single image of urban land use with little green space.

The slopes of the freeway and overpasses define the existing viewshed from the interchange in Segment A. The viewshed is enclosed and provides views of several industrial and commercial buildings that are vacant. In comparison to the rest of the project area, this segment is less intensely developed and has a greater amount of vegetation on embankments. At the M-10 interchange, the view includes both institutional and office buildings. The campus of WSU dominates the viewshed with its buildings and parking structures. Although a depressed facility, at certain locations along M-10 the viewshed includes the Fisher Building, a designated National Landmark.

The viewshed of Segment B is broad to the north from both the eastbound and westbound lanes of I-94. Industrial, commercial, institutional, and residential buildings are visible. On the north side of I-94, the steeple of Our Lady of the Rosary Roman Catholic Church, listed on the National Register of Historic Places (NRHP), is easily recognizable in the skyline. Also, a unique grouping of old brick apartments near the church provides additional visual interest to the area. The grass embankment is high with some mature trees along local streets. The viewshed decreases in length where the freeway is depressed and lies under several overpasses. At the I-75 interchange, industrial buildings define the view.

Segment C is similar to Segment B in that the area of the viewshed increases as the driver reaches the crest of the I-94/I-75 interchange. The interchange provides distant views of the high-rise buildings of the Renaissance Center to the south and scattered urban development such as row houses and industrial land uses to the east. Water towers on top of old industrial buildings and billboards serve as visual focal points. The St. Stanislaus Roman Catholic Church complex, listed on the NRHP, provides visual interest. The red brick, Mediterranean-influenced architecture of the Eastside Branch of the YMCA also provides visual interest. Because of a decreasing slope of embankments, the eastbound I-94 viewshed increases slightly as Conner Avenue is approached.

5.4.1.4 Landscape Units

The project area is divided into six visually distinct "landscape units" that articulate the aesthetic and visual character of the existing environment (Figure 5-8). A landscape unit is defined as an area of distinct, but not necessarily homogeneous, visual character. These units describe specific portions of the project area and provide a framework for comparing the visual effects of the proposed alternatives.

The number of landscape units is limited because these units are not usually less than 0.5 mile in length which represents approximately 30 seconds of visual experience. The visual experience is limited due to the numerous disruptive freeway components and the setting in which the viewer from the road is placed.

Transportation Landscape Unit. This landscape unit (Figure 5-8A) consists of the I-94 alignments and associated retaining walls, overpasses, underpasses, and bridges. Due to freeway design, travel speed, and the amount of traffic, users of the facility experience little viewshed outside of the right-of-way. The freeway becomes the focal point and has low memorability, as is typical of urban freeways. This view includes the urban freeway elements that dominate the general viewshed of the project area. The Transportation Landscape Unit is found in Segments A, B, and C. The overall visual quality of this landscape unit and viewer sensitivity are low.

Historic Landscape Unit. This landscape unit (Figure 5-8B) includes a historic element surrounded by other elements. For example, the St. Josaphat Roman Catholic Church is on the National Register of Historic Places (NRHP) and is a visual resource within the project area. The view from I-94 includes the church in the urban skyline. Although many typical urban elements exist, including obtrusive lighting, overpasses, and signs, a unique view is provided within the typical urban setting. This view provides a contrast from other urban developments located within the project area. It creates a high degree of memorability.

Institutional Landscape Unit. This landscape unit (Figure 5-8C) contains churches and educational and institutional facilities. The visual quality of this landscape unit is moderate in comparison to the other views within the project area. The views of many of the institutional uses are memorable due in part to their size and concentration. For example, WSU is a large presence in Segments A and B. The WSU parking structure dominates this landscape unit. The unity of the institutional landscape unit, however, is discontinuous due to the units smaller concentrations.

Industrial Landscape Unit. This landscape unit (Figure 5-8D) consists of high-density industrial properties, some of which are vacant. This view is predominant throughout the corridor, especially in Segment B and around the I-75 interchange. Heavy industry in the project area includes a solid waste treatment plant and manufacturers of paint, steel, glass, and automobile parts. The conditions of the structures vary. The view from the freeway reflects the industrial nature of the area. In addition, water towers, power lines, and smokestacks in the background further add to the industrial nature of this landscape unit.

Residential Landscape Unit. This landscape unit (Figure 5-8E) is composed of residential housing and multi-family complexes. Vacant lots where houses once stood are interspersed within residential areas. The majority of the houses that have remained intact are located at the western and eastern sections of the project area in Segments A and C. Some neighborhoods have developed a theme or identity. Segment C contains a

large area of concentrated single-family houses in a cohesive landscape unit. The character of the houses is similar with little diversity in design and scale. This particular unit incorporates housing typical for the area and urban elements such as lighting and billboards. In general, the presence of these commonplace elements does not make this unit particularly memorable.

Mixed-Use Landscape Unit. This landscape unit (Figure 5-8F) consists of industrial, commercial, and residential land uses and is found in all project area segments. It represents those areas that contain unrelated architecture, have contrasting characters, and lack strong visual unity. A typical grouping of buildings in the mixed landscape unit may include a gasoline station, older row houses, and a small commercial storefront. This view is a typical landscape unit within the urban setting. It provides several land uses in one view, none of which is dominant.

5.4.2 Impacts to Aesthetics and Visual Resources

Visual impacts, according to the FHWA, result from modification of existing visual resources or the view of and from the project. These impacts are particularly important for projects in visually sensitive urban or rural settings where design and planning considerations include methods for avoiding, minimizing, or reducing effects. Impacts to aesthetics and visual resources as a result of implementation of the alternatives are discussed below. All of the alternatives would have short-term visual impacts during construction.

5.4.2.1 No-Build Alternative

As I-94 bridges and freeways deteriorate and are repaired, the visual quality of the freeway would deteriorate. The No-Build Alternative would maintain the freeway in a patched visual condition. The No-Build Alternative would not facilitate redevelopment of neighborhoods and so would not contribute to improvement of aesthetics of neighborhoods.

5.4.2.2 Enhanced No-Build Alternative

The Enhanced No-Build Alternative would result in improved freeway aesthetics in phases as deteriorating bridges are replaced with new bridges. The freeway would not have an integrated new appearance and would have limited opportunity to improve the visual character of the freeway. Like the No-Build Alternative, the Enhanced No-Build Alternative would not facilitate redevelopment of neighborhoods and would not contribute to improvements in the visual character of the project area.

5.4.2.3 Build Alternative

In general, construction of a new freeway and related structures with aesthetic treatments to replace the current deteriorating freeway and structures would benefit the aesthetics of the project area. The Build Alternative is in compliance with, and would facilitate,

redevelopment plans of areas such as New Center and the University Cultural Center area. As these areas are renovated and revitalized, aesthetics would improve.

Transportation Landscape Unit. The Build Alternative would replace deteriorating bridges and ramps. The bridges, ramps, and retaining walls would be designed to include aesthetic treatments that would be determined during design. The aesthetics of this unit would be improved, and the Build Alternative would result in a beneficial aesthetic impact for views of and from the project.

Grassy slopes on the freeway would be replaced by retaining walls. During public involvement meetings, the public expressed preference for grassy slopes for aesthetic reasons. Slopes require more right-of-way than retaining walls. To reduce the number of homes and businesses acquired, retaining walls would be used and would not be as visually pleasing as grassy slopes.

Historic Landscape Unit. The Build Alternative would have minor aesthetic impacts on historic landscape units within the project area. The United Sound Systems Recording Studios building is eligible for listing on the NRHP and would be removed. A duplex and a store within the Woodbridge Neighborhood Historic District would also need to be removed. Because the Build Alternative would facilitate community redevelopment, the Historic Landscape Unit would benefit in the long run as it becomes revitalized.

Institutional Landscape Unit. The Build Alternative would move the I-94 service drive closer to the parking garage and athletic fields at WSU. The resulting impact of a closer road and traffic would be a minor visual impact to those using the playing field and a closer view of the parking garage from the freeway.

Industrial Landscape Unit. The Build Alternative would remove some industrial buildings. The impact would be beneficial if unmaintained and deteriorating vacant buildings are acquired and removed.

Residential Landscape Unit. Several residential houses and apartments adjacent to the existing freeways would be removed to construct the Build Alternative. The result would be a loss of some visually interesting architecture. This would be a moderate impact to the Residential Landscape unit. As the freeway facilitates redevelopment of the community and houses are remodeled or new housing is constructed, the resulting aesthetics would be a beneficial impact of the Build Alternative.

Some residential areas would be provided with noise walls that would block views of the freeway. These noise walls would improve aesthetics for the residents and would be a beneficial impact.

Mixed-Use Landscape Unit. The new freeway would provide improved aesthetics and improved access to the Mixed-Use Landscape Unit. The improved access would result in revitalization of the area and new and remodeled structures would contribute to the improved aesthetics of the project area.

5.4.3 Mitigation

The conceptual design of the Build Alternative is a result of several refinements to the Continuous Service Drives and Braided Ramps alternatives. The Build Alternative optimizes access to adjacent communities and commercial districts and reduces access and displacement impacts. The refinements also result in reduced sizes of the I-94/M-10 and I-94/I-75 interchanges and less intrusion into the viewshed from the surrounding area.

The freeway, retaining walls, and other related structures would receive aesthetic treatment. The actual treatment would be determined during the design phase of the project. Treatments considered would include design and color of the retaining walls and bridges. Noise walls would also be designed to be visually pleasing.

The right-of-way outside of the freeway itself would receive landscape treatment to soften the view of the freeway for area residents and enhance the urban nature of sensitive areas.

5.5 Air Quality

5.5.1 Relevant Pollutants

Air pollution is a general term that refers to one or more chemical substances that degrade the quality of the atmosphere. Individual air pollutants degrade the atmosphere by reducing visibility, damaging property, reducing the productivity or vigor of crops or natural vegetation, or reducing human or animal health.

The U.S. Environmental Protection Agency (EPA) has identified eight air pollutants that are of nationwide concern: carbon monoxide, sulfur oxides, hydrocarbons, nitrogen oxides, ozone, particulate matter sized 10 microns or less, particulate matter sized 2.5 microns or less, and lead. The sources of these pollutants, their effects on human health and the nation's welfare, and their final deposition in the atmosphere vary considerably. A brief description of each pollutant is found in Appendix H.

5.5.2 National and State Ambient Air Quality Standards

As required by the Clean Air Act, National Ambient Air Quality Standards (NAAQS) have been established for seven major air pollutants: CO, NO_2, O_3, $PM_{2.5}$, PM_{10}, SO_x, and Pb. New NAAQS for O_3 and $PM_{2.5}$ were passed into law on July 16, 1997 (Federal Register Notice July 18, 1997, effective date September 16, 1997). The new standards were set aside however on May 14, 1999. A brief description of each pollutant is found in Appendix H.

National and state ambient air quality standards are summarized in Table 5-9 and described below. The primary standards have been established to protect public health. The secondary standards are intended to protect the nation's welfare and account for air

pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare.

5.5.3 Air Quality Regulations and Planning

5.5.3.1 Clean Air Act Amendments of 1990

The Clean Air Act Amendments of 1990 (CAAA) and the Final Conformity Rule (40 CFR, Parts 51 and 93) direct the EPA to implement environmental policies and regulations that will ensure acceptable levels of air quality.

The CAAA and the Final Conformity Rule affect proposed transportation projects such as the I-94 Rehabilitation Project. According to Title I, Section 101, Paragraph F, of the Amendments, "No federal agency may approve, accept, or fund any transportation plan, program, or project unless such plan, program, or project has been found to conform to any applicable State Implementation Plan (SIP) in effect under this act." The Final Conformity Rule defines conformity as follows:

> Conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards; and that such activities will not:
>
> 1. Cause or contribute to any new violation of any NAAQS in any area; increase the frequency or severity of any existing violation of any NAAQS in any area; or
> 2. Delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area.

National and State ambient air quality standards are shown in Table 5-9.

5.5.3.2 Attainment Status of the Project Area

Section 107 of the 1977 CAAA requires EPA to publish a list of all geographic areas in compliance with the NAAQS, as well as those not in compliance with the NAAQS.

Areas not in compliance with the NAAQS are termed nonattainment areas. Areas that have insufficient data to make a determination are unclassified and are treated as attainment areas until proven otherwise. Areas which were designated as nonattainment when the CAAA were implemented but have since attained compliance with the standards are classified as maintenance areas. The designation of an area is made on a pollutant-by-pollutant basis.

Almost all of Michigan is classified as an attainment area for CO. Prior to 1999, portions of Wayne, Oakland, and Macomb counties were designated as unclassified, non-attainment areas. Because monitoring data collected since 1995 show the NAAQS are being met, these areas were officially redesignated to attainment/maintenance status on

August 30, 1999. The region is in attainment for the 1-hour standards for ozone and CO and the 8-hour standard for CO.

Table 5-9
National and State Ambient Air Quality Standards

Pollutant	Averaging Period	Primary[a]	Secondary
Carbon Monoxide	8-Hour[b]	9 ppm (10 ug/m^3)	No Secondary Standard
	1-Hour[b]	35 ppm (40 ug/m^3)	No Secondary Standard
Lead	Maximum Quarterly Average	1.5 ug/m^3	Same as Primary
Nitrogen Dioxide	Annual Arithmetic Mean	0.053 pp (100 ug/m^3)	Same as Primary Standard
Ozone	Max. Daily 1-Hour Average[c]	0.12 ppm (235 ug/m^3)	Same as Primary Standard
	4th Highest 8-Hour Daily Maximum[d, g]	0.08 ppm	Same as Primary Standard
Particulate Matter (PM_{10})	Annual Arithmetic Mean[e]	50 ug/m^3	Same as Primary
	24-Hour[e]	150 ug/m^3	Same as Primary
Fine Particulate Matter (PM2.5)**	Annual Arithmetic Mean[f, g]	15 ug/m^3	Same as Primary
	98th percentile 24-hour[f, g]	65 ug/m^3	Same as Primary
Sulfur Dioxide	Annual Arithmetic Mean	80 ug/m^3 (0.03 ppm)	-
	24-Hour[b]	365 ug/m^3 (0.14 ppm)	-
	3-Hour[b]	---	1300 ug/m^3 (0.5 ppm)

Source: U.S. Environmental Protection Agency, "National Primary and Secondary Ambient Air Quality Standards" (49 CFR 50), Michigan Department of Environmental Quality, Air Quality Division.

[a] Parenthetical value is an approximately equivalent concentration.

[b] Not to be exceeded more than once per year.

[c] The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.1 ppm is equal to or less than 1, as determined according to Appendix H of the Ozone NAAQS. The 1-hour standard only applies to areas that are still designated nonattainment. For areas with air quality data showing attainment, the 1-hour has been revoked.

[d] The 8-hour ozone standard applies to areas that have been designated as reaching attainment of the 1-hour standard. The 8-hour standard is met when the 3-year average of the annual fourth-highest daily maximum 8-hour ozone concentration is less than or equal to 0.08 ppm.

[e] Particulate standards when using PM_{10} (particulates less than 10 mm in diameter) as the indicator pollutant. The annual standard is attained when the expected annual arithmetic mean concentration is less than or equal to 50 ug/m^3 (3-year average); the 24-hour standard is attained when the expected number of days above 150 ug/m^3 is equal to or less than 1.

[f] Particulate standards when using $PM_{2.5}$ as the indicator pollutant. The annual standard is met when annual average of the quarterly mean $PM_{2.5}$ concentrations is less than or equal to 15ug/m3, when averaged over 3 years. If spatial averaging is used, the annual averages from all monitors within the area may be averaged in the calculation of the 3-year mean. The 24-hour standard is met when the 98th percentile value, averaged over 3 years, is less than or equal to 65 ug/m3.

[g] On May 14, 1999, the Circuit Court of Appeals for the District of Columbia remanded the revised ozone and particulate standards to the EPA for re-evaluation.

Abbreviations: ppm = parts per million, ug/m^3 = micrograms per cubic meter.

The ozone standard is being phased out and replaced with a new 8-hour standard set to protect public health against longer exposure periods. On May 14, 1999 a panel of the US Court of Appeals set aside the new ozone standard. The new 8-hour standard is in place but is currently not enforceable.

Michigan has not been classified as attainment or nonattainment for ozone with regard to the new 8-hour standard. Although the 8-hour ozone standard was promulgated on July 18, 1997, the old 1-hour standard remains in effect until formally revoked by the EPA on an area-by-area basis. The EPA policy is not to revoke the 1-hour standard for an area until the area actually attains the standard. On June 5, 1998, the old standard was revoked for most Michigan counties previously classified as attainment/no data unclassified areas.

On July 22, 1998, the EPA revoked the 1-hour ozone standard for the areas that were previously classified as attainment/maintenance, including Kent, Ottawa, Macomb, St. Clair, Oakland, Livingston, Wayne, Washtenaw, and Monroe counties. While the 8-hour standard is in effect, designations of attainment or nonattainment for the standard will not be made until the year 2000. Though Court action has remanded the standard, EPA is permitted to proceed with the designation process. EPA will use the 3 years of data most recently available at that time to make designations.

If ozone standards are set forth by the EPA and the project area is classified as nonattainment for ozone prior to construction, project air quality analysis will be reevaluated.

All areas of Michigan are classified as in attainment for PM_{10}, Pb, and NO_2.

Industries voluntarily, or under agreement or order, submit air monitoring data to the Air Quality Division (AQD), Michigan Department of Environmental Quality (DEQ). Data collected and reported thereby must meet minimum quality assurance requirements established by the AQD and EPA, as outlined in Federal Register Part 58 and its appendices.

Ambient air quality monitor data for CO, O_3, and PM_{10} for 1998 are presented in Table 1 in Appendix H.

5.5.4 Impact Assessment

5.5.4.1 Pollutants for Analysis

Pollutants that can be traced principally to motor vehicles and are thus relevant to the evaluation of project impacts include CO, HC, NO_x, O_3, and PM_{10}. Transportation sources account for a very small percentage of regional emissions of SO_x and Pb; thus a detailed analysis is not required. While EPA has indicated that PM_{10} is a pollutant of concern for mobile source projects, PM_{10} hot spot analysis guidance has not been adopted by EPA. It is possible that a hot-spot analysis for PM_{10} may be required in the future.

HC and NO_x emissions from automotive sources are of concern primarily because of their role as precursors in the formation of ozone and particulate matter. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Since the reactions are slow and occur as the pollutants are diffusing downwind, elevated

ozone levels are often found many miles from sources of the precursor pollutants. The effects of HC and NO_x emissions are therefore generally examined on a regional or "mesoscale" basis. PM_{10} is also examined on a regional basis, although, as previously discussed, a localized or hot-spot analysis may be required in the near future.

CO impacts are localized. Even under the worst meteorological conditions and most congested traffic conditions, high concentrations are limited to within a relatively short distance 300 to 600 feet of heavily traveled roadways. Vehicle emissions are the major source of CO, and 96 percent of the CO comes from gasoline-powered cars and trucks. Consequently, it is appropriate to predict concentrations of CO on a localized or "microscale" basis.

The CO levels estimated by the model are the maximum concentrations that could be expected to occur at each air quality receptor site analyzed, given the assumed simultaneous occurrence of a number of worst-case conditions (i.e., peak hour traffic conditions, conservative vehicular operating conditions, low wind speeds, low atmospheric temperature, neutral atmospheric conditions, and maximizing wind direction).

5.5.4.2 Existing Conditions

Background Concentrations. The Michigan Air Sampling Network (MASN) is designed to measure air quality throughout the state. The network is operated by AQD and city or county agencies, as well as industries. Since the measurable concentration of a given air contaminant at a particular time and place is highly dependent on meteorological conditions, wind speed, and direction of instruments, barometric pressure, solar radiation, and relative humidity are also monitored at some of these locations. The AQD verifies, analyzes, and collates all data collected by the MASN.

Microscale modeling is used to predict CO concentrations resulting from emissions from motor vehicles using roadways immediately adjacent to the location at which predictions are being made. A CO "background" level must be added to this value to account for CO entering the area from other sources upwind of the receptors.

A 1-hour CO background level of 3.3 ppm and an 8-hour background level of 3.0 ppm were added to each analysis site. These values are the second highest 1-hour and 8-hour readings from the Livonia monitoring station for the year 1998.

Traffic Data. Traffic data for the air quality analysis were derived from traffic counts and other information developed as part of an overall traffic analysis for the project using methodology accepted by MDOT. The microscale CO analysis was performed based on data from this analysis for the AM and PM peak traffic periods. These are the periods when maximum traffic volumes occur on local streets and when the greatest traffic and air quality effects of the proposed project are expected.

The percentages of each type of vehicle, for the existing and future year conditions, were determined using data for Detroit provided by SEMCOG. Vehicle speeds used in the analysis were obtained from traffic information developed for this project. Appendix H contains traffic information used for the air quality analysis.

5.5.5 Impacts

Maximum 1-hour and 8-hour CO levels predicted at the eight analysis sites within the project area are shown in Table 5-10 and 5-11, respectively. CAL3QHC (Version 2) input and output information for each site is contained in Appendix H. Predicted CO concentrations for the Practical Alternatives are below the applicable federal and state air quality standards. Therefore, the air quality impacts are not significant.

Table 5-10
Predicted Worst-Case 1-Hour CO Concentrations (ppm)

Site #	Receptor Location	1995		2020 No-Build and Enhanced No-Build Alternatives		2020 Build Alternative	
		AM	PM	AM	PM	AM	PM
1	Intersection of I-94 WB on/off ramps/Trumbull	6.3	7.1	6.4	7.5	8.5	12.4
2	Intersection of I-94 EB on/off ramps/Trumbull	9.3	10.7	9.3	10.4	7.8	10.0
3	Interchange of I-94/M-10	6.4	7.0	6.9	8.0	6.0	6.3
4	Interchange of I-94/I-75	6.4	7.5	8.2	9.0	6.9	5.8
5	Intersection of I-94 WB on/off ramps/Mt. Elliot	8.3	10.5	9.4	11.0	7.5	12.9
6	Intersection of I-94 EB on/off ramps/Mt. Elliot	9.4	10.1	10.1	11.3	8.9	13.0
7	Intersection of I-94 WB on/off ramps/Gratiot (including Gratiot/Harper)	10.3	7.3	9.5	9.9	9.4	11.4
8	Intersection of I-94 EB on/off ramps/Gratiot (including Gratiot/McClellan)	9.2	10.3	8.5	11.7	8.4	13.0

NOTE: Concentrations include a CO background level of 3.3 ppm. The 1-hour CO standard is 35 ppm. WB=Westbound, EB=Eastbound

Table 5-11
Predicted Worst-Case 8-Hour CO Concentrations (ppm)

Site #	Receptor Location	1995	No-Build and Enhanced No-Build Alternatives	Build Alternative
1	Intersection of I-94 WB on/off ramps/Trumbull	5.3	5.5	8.5
2	Intersection of I-94 EB on/off ramps/Trumbull	7.4	7.3	7.0
3	Interchange of I-94/M-10	5.2	5.8	4.8
4	Interchange of I-94/I-75	5.5	6.4	5.2
5	Intersection of I-94 WB on/off ramps/Mt. Elliott	7.3	7.6	8.8
6	Intersection of I-94 EB on/off ramps/Mt. Elliott	7.1	7.8	8.8
7	Intersection of I-94 WB on/off ramps/Gratiot (including Gratiot/Harper)	7.2	7.0	7.9
8	Intersection of I-94 EB on/off ramps/Gratiot (including Gratiot/McClellan)	7.2	8.0	8.8

NOTE: Concentrations include a CO background level of 3.0 ppm. The 8-hour CO standard is 9 ppm.
WB=Westbound, EB=Eastbound

5.6 Noise

This section summarizes the noise analyses performed for existing and future conditions for each of the proposed alternatives. Noise studies consider the existing levels of noise within a particular area and compare them to modeled future noise levels.

The common measure of vehicular noise is the decibel. The decibel is a measure used to express the relative level of a sound in comparison with a standard referenced level. An increase of 10 decibels is a ten-fold increase in power and is generally perceived as a doubling of loudness. Traffic noise levels are expressed in dBA $L_{eq}(h)$, where dBA refers to the A-weighted equivalent sound level in decibels. An A-weighted sound level represents all the sound being measured at any moment with adjustments to represent how the human ear hears the sound. $L_{eq}(h)$ is defined as the equivalent steady-state sound level that, in a period of one hour, contains the same acoustic energy as the time-varying sound level during that hour.

5.6.1 Noise Assessment Guidelines

Noise Abatement Criteria (NAC) and MDOT policies for implementing the NAC were used in the analysis of the acoustic impact of the proposed action. The NAC, which is contained in the Code of Federal Regulations, Title 23, Part 772, revised April 1998, provides the procedures to determine the acoustic impact of a proposed action. The acoustic action can then be assessed and the need for abatement measures for any noise impacts can be determined. The NAC for various land uses are presented in Table 5-12.

Table 5-12
Noise Abatement Criteria - Hourly A-Weighted Sound Level - Decibels (dBA)

Activity Category	One Hour L_{eq}	Description Of Activity Category/Land Uses
A	57 dBA (Exterior)	Land on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the lands are to continue to serve their intended purpose.
B	67 dBA (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 dBA (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 dBA (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

Source: Title 23, Code of Federal Regulations (CFR), Part 772, revised April, 1998

5.6.2 Abatement Measures

Abatement measures, such as noise walls or berms, are considered when modeled future noise levels approach or exceed the NAC. The FHWA and MDOT define "approach" as a noise level that is 1 dBA less than the NAC. For example, in the case of Category B land use, a noise level of 66 dBA Leq would approach the NAC. Abatement measures are also considered when traffic noise levels from the proposed project substantially exceed existing noise levels. A substantial increase would be 10 dBA or more over existing traffic noise levels.

5.6.3 Existing Noise Conditions

Land use in the rehabilitation corridor is primarily a mix of residential and industrial, with scattered commercial. Noise levels were analyzed for each category.

Existing short-term noise level measurements were taken on April 10, 1996, and March 23, 1999, at 24 representative sites within the project corridor: 11 residences, one mixed residential/commercial site, one apartment building, one park, one hospital, three churches, two university buildings, and four schools. The locations of the receptor sites are listed in Table 5-13 and shown in Appendix E.

The measurements for existing noise levels were performed in accordance with the FHWA's *Measurement of Highway-Related Noise* using an integrating sound level meter meeting ANSI and IEC type 1 specifications. Noise measurements were conducted for a period of 20 minutes at each site. Traffic counts on the existing I-94 mainline, service drives, and local streets were taken at each site simultaneously with the noise measurements. Traffic data along M-10 and I-75 are based upon daily traffic volumes for the specific location and time. The measurements were taken between 7:30 AM and 4:00 PM. The noise levels ranged from 61 to 71 dBA along the service drives that parallel I-94, M-10, and I-75. Receptors located a half block or more away from the service drives had ambient noise levels ranging from 56 to 63 dBA L_{eq}. The locations and the data collected at the 24 sites are presented in Appendix I.

The FHWA's Traffic Noise Model V 1.0b (TNM®) was used to verify the field measurements using traffic count information to determine the applicability of the model to the specific project environment.

5.6.4 Modeled Noise Impact

The FHWA highway traffic noise prediction computer program, Traffic Noise Model V 1.0b (TNM®), was used to model traffic noise levels for the existing condition in 1999 and the No-Build and Build alternatives in the 2020 design year. Peak-period traffic volumes and vehicle mix were used in the analysis. Noise receptors were chosen based upon aerial photos and CAD drawings of the project area. The 63 noise receptor locations represent 358 residences, 3 churches, 6 schools, 2 hospitals, 1 park, 4 university buildings, 1 government building, and 31 commercial sites. The noise receptor locations are shown in Figure 5-9A, B, and C and Appendix I. Results of the noise modeling are shown in Table 5-13.

Overall, noise levels along I-94 are slightly higher for the Build Alternative than for the No-Build alternatives. However, on portions of M-10 and I-75, where traffic volumes are projected to decrease, peak-hour noise levels are 2 to 4 decibels lower than the No-Build alternatives.

Based on 2020 peak-hour volumes on I-94 of 14,800 to 17,600 vehicles, the 66 dBA L_{eq} contours are estimated to parallel I-94 approximately 475 feet to 540 feet from the

centerline of I-94. This means that noise levels between the contour on one side of I-94 and the contour on the other side are 66 dBA or greater. These contours were developed to assist local planning authorities to develop land use guidance for the land in transition along the rehabilitation corridor to prevent further development of incompatible land uses.

Table 5-13
Existing and Future Noise Levels

Receptor Location	Number of Front Row Properties Typical of This Receptor Site	Sound Level, L_{eq} (dBA)		
		Existing (1999)	No-Build Alternatives (2020)	Build Alternative (2020)
N1	2 residences	71	72	72
FS 1	5 residences	70	71	71
N2	14 residences, 1 commercial	69	70	71
FS 2	1 residence	64	65	66
N3	6 residences	68	69	70
FS 3	18 residences	67	69	72
N4	6 residences	63	65	66
N5	12 residences	70	70	71
N6	8 residences	57	58	61
N7	6 residences	65	65	66
N8	5 residences	65	65	67
N9	5 residences	65	65	67
N10	4 residences	71	71	73
FS 14	Park	66	67	65
N11	8 residences, 1 university building	69	70	68
N12	8 residences	69	70	67
N13	1 church	67	68	65
FS 15	1 university building	70	71	68
N14	1 university building	69	70	67
N15	2 commercial	67	68	66
FS 16	1 hospital	68	69	67
N16	2 residences, 2 commercial	69	70	68
FS 17	1 school	70	71	69
N17	1 commercial	70	71	69
FS 18	3 residences, 2 commercial	71	72	70
FS 18A	2 residences	68	69	67
N18	1 residence, 1 historical, 3 commercial	73	74	74
N19	3 residences, 1 church	72	73	73
FS 4	14 residences	69	71	72

Receptor Location	Number of Front Row Properties Typical of This Receptor Site	Sound Level, L_{eq} (dBA)		
		Existing (1999)	No-Build Alternatives (2020)	Build Alternative (2020)
N20	10 residences	71	73	71
FS 5	12 residences	72	73	77
N21	8 residences	69	70	73
N22	18 residences, 1 government, 1 commercial	75	76	72
FS 19	21 residences	74	75	71
FS 20	1 commercial	68	69	65
N23	2 residences, 1 commercial	75	76	72
N24	10 residences	72	73	69
N25	11 residences	74	75	71
N26	1 residence	72	73	69
FS 21	1 school	72	72	69
FS 22	1 residence, 1 church	73	74	70
N27	1 hospital, 4 commercial	73	74	70
N28	13 residences, 2 commercial	74	75	71
FS 23	2 schools, 1 commercial	75	76	72
FS 6	10 residences	71	72	72
N29	16 residences	69	70	70
FS 7	7 residences	70	70	70
N30	7 residences	70	71	73
N31	11 residences, 1 commercial	72	73	74
N32	4 residences, 1 school	70	71	72
FS 8	1 school	72	72	74
FS 9	13 residences, 1 commercial	68	70	72
N33	9 residences	70	71	72
FS 10	23 residences	69	70	72
N34	4 residences, 4 commercial	68	69	70
N35	2 residences, 2 commercial	69	70	70
FS 11	8 residences	69	69	70
N36	11 residences	69	70	71
FS 12	1 residence	64	65	67
N37	7 residences	69	70	71
N38	1 residence, 1 commercial	68	69	70
FS 13	1 university	66	67	68
N 39	1 residence	71	72	71

5.6.5 Noise Mitigation Measures

On June 12, 1995, the FHWA issued revised guidance on traffic noise analysis and a memorandum requiring all State Highway Agencies (SHAs) to adopt written noise

policies according to the revised guidance. The revised FHWA policy included new stipulations regarding acceptable cost-per-residence criteria and definition of "benefited" residences. The draft policies of each SHA were to be reviewed by FHWA and approved. Each SHA had to adopt an approved traffic noise policy within 1 year of the date of the FHWA memorandum. MDOT revised the state's noise policies in June 1996. The MDOT criteria for provision of noise abatement now state the following:

- Noise barriers would only be provided for impacted Category B type land use that is not expected to change to commercial or industrial land use. No noise abatement would be considered for a development constructed after public notification of a proposed highway project.
- A maximum cost per residence receiving benefit from noise abatement of $30,000 (Year 2000 dollars) is allowable. If this cost is exceeded, the noise abatement measure(s) would be re-evaluated and possibly eliminated, unless affected residents or the local jurisdiction agree to pay the cost difference.
- There must be present at least seven residential units for a noise wall or earthen berm to be considered.
- Noise walls and earthen berms must provide a minimum 6 dBA decrease in noise levels, and must be a minimum of 590 feet in length and a maximum of 25 feet in height.
- Air conditioning and noise insulation of residential structures would be considered where new highway projects would result in a noise level of 75 dBA or higher, or an increase in noise level of 30 dBA or more, and where no other noise abatement measures would be feasible.
- Residential units that have been converted to commercial or industrial uses would not receive noise abatement because, generally, unobstructed visibility of commercial sites is preferred.

In general, several strategies can be used to mitigate noise impacts. Possible strategies include:

- The construction of noise barriers,
- Traffic management measures such as modified speed limits and prohibitions and/or time restrictions on heavy trucks, and
- Property acquisition to serve as a buffer zone between the freeway and impacted properties.

Various methods were considered for mitigation of potential noise impacts of the Build Alternative. Among these were:

- Reduction of speed limits
- Restriction of truck traffic to specific times of the day
- A total prohibition of trucks
- Alteration of horizontal and vertical alignments
- Property acquisition for construction of noise barriers or berms
- Acquisition of property to create buffer zones to prevent development that could be a impacted
- Noise insulation of public use or nonprofit institutional structures

- The use of berms
- The use of sound barriers

Reductions of speed limits, although acoustically beneficial, are seldom practical unless the design speed of the proposed freeway is also reduced. Restriction or prohibition of trucks is contrary to the project purpose. Design criteria and recommended termini for the proposed project prevent substantial horizontal and vertical alignment shifts that would produce noticeable changes in the projected acoustical environment. Creating a buffer zone would require purchasing hundreds of residential and commercial properties within a strip of land approximately 820 feet wide paralleling the corridor in developed areas. This buffer zone would be required both north and south of the corridor and would remove many acres from the regional tax base and would not be beneficial to the corridor.

The construction of noise berms would require a substantial acquisition of additional right-of-way. Therefore, only the construction of noise barriers, where applicable, will be studied in detail as the most appropriate method of mitigation. Noise abatement by barriers is considered by MDOT according to the guidelines described earlier, and the implementation of barriers must be feasible and reasonable. MDOT has defined feasible as the ability to achieve a 6 dBA reduction in the design-hour Leq noise level. Reasonability is defined primarily by economic considerations, with the cost per residence benefited not to exceed $30,000.

Possible location options for noise barriers are:

- Between the mainline and the service drives
- At the right-of-way line between the service drives and adjacent properties (effective if access to service drives is restricted)
- A combination of barriers at both locations

5.6.5.1 Barrier Analysis

Noise mitigation was reviewed for all residential areas where the 2020 design-year noise level approached or exceeded 67 dBA $L_{eq}(h)$. Nine specific areas were analyzed. The results are in Appendix I. Developing feasible mitigation in the presence of service drives is acoustically challenging. Modeling indicated that if the hourly volumes on a service drive exceed 2000 vehicles per hour it would not be possible to achieve a 6 dBA reduction in noise. In addition, the minimum barrier length of 590 feet, per MDOT policies, eliminates consideration of construction of noise barriers between service roads and houses in areas where it is necessary to maintain local street and/or driveway access. This condition occurs in numerous locations along the corridor where city blocks are perpendicular to I-94. In other areas along I-94 the cost per residence exceeds MDOT's $30,000 per residence criterion (Table 5-14).

Table 5-14
Mitigation
Noise Barrier Locations

Barrier No.	Locations (Receptor No.)	Existing Leq(h) Noise Levels, dBA	Range of Future Leq(h) Noise Levels, dBA		Noise Reduction (dB)	Barrier Characteristics		Cost[1)]	Number Of Units Attenuated	Cost/ Unit
			w/o Barriers	Barrier		Length	Height			
1	South of I-94, Grand River Ave. to 14th St. (N1, FS 1)	65	72	65-66	5-6	480 m	4 m	$633,600	8	$79,200
2	NW Quadrant of I-94/M-10 Interchange (N4-N7)	63	66-71	58-65	6-8	483 m	3-5 m	$916,667	28	$32,738
3	West of I-75 Southbound On-ramp to Canfield Ave. (FS 19)	67	71-72	64-66	6-7	396 m	4 m	$522,720	21	$24,891
4	East of I-75, Canfield Ave. to Forest Ave. (N22)	75	72	66	6	220 m	4 m	$290,400	18	$16,133
5	West of I-75, Warren Ave. to Ferry St. (N25)	66	71	65	6	320 m	4 m	$422,400	22	$19,200
6	West of I-75, Euclid St. to Clay Ave.	62	72	64-66	6-8	366 m	4-5 m	$543,156	2 Schools	$543,156
7	West of I-75, Custer St. to Clay St. (FS 22)	65	70	64	6	150 m	4m	$198,000	10	$19,800
8	South of I-94, Concord St. to Frontenac St. (N31)	72	74	68	6	305 m	7 m	$704,550	8	$88,069
9	South of I-94, French St. to Fairview St. (N37)	69	71	65-66	5-6	325 m	4 m	$490,000	7	$61,286

1) Based on $330.00 per square meter for concrete noise wall

The residential district south of I-94 between Grand River Avenue and Fourteenth Street is representative of the residential areas abutting the corridor. The local streets are perpendicular to I-94 and Kirby Avenue that parallels I-94, with only two residences per block exposed directly to I-94. A noise barrier (Barrier No. 1) located between Kirby and I-94 would provide a 5 to 6 dBA noise reduction for eight residences. This noise barrier would be 13 feet high. The estimated cost for this noise barrier, $31 per square foot, would be $633,000. The cost of the barrier, $79,200 per residence, exceeds the cost per residence criterion.

A large multi-family development is located in the northwest quadrant of the M-10/ I-94 interchange. A 6 to 8 dBA reduction is reasonable with a noise barrier 10 to 16 feet high and 1585 feet long paralleling the southbound M-10 ramp to westbound I-94, from McCoy Street to Trumbull Avenue. The estimated cost for the noise barrier would be $916,667. This barrier, Barrier No. 2, would provide a feasible 6 dBA or more noise reduction at 28 residential units exposed to noise levels exceeding the NAC. This would correspond to $32,738 per mitigated residence, which exceeds the $30,000 criterion for cost established by MDOT.

A noise barrier was analyzed for the residential area west of I-75 between Warren and Canfield Avenues. Barrier No. 3 would be 1300 feet long and 13 feet high above the retaining wall. It would provide 6 to 7 dBA of attenuation for 20 residences and a church. The estimated cost of this barrier, at $31 per square foot, would be $522,720, with a cost of $24,891 per residence. This would meet the $30,000 criteria of being reasonable. Therefore, Barrier No. 3 is reasonable and feasible.

Barrier No. 4 was analyzed east of I-75 between Canfield and Forest Avenues. This barrier would be located between the service drive and I-75 for a length of 720 feet. It would provide 6 dBA of attenuation to 18 residences. The noise barrier would be 13 feet tall and cost $290,400. The cost per residence would be $16,133. This noise barrier meets MDOT's criteria for feasibility and reasonableness.

North of Warren Avenue and west of I-75 there are two large residential developments that consist of an estimated 22 first-floor living units. A noise barrier would be located on I-75 and the service drive from Ferry Street to Warren Avenue, a total length of 1,050 feet. Barrier No. 5 would be 13 feet tall and provide a 6 dBA reduction to the receptors. The estimated cost for this noise barrier would be $422,400, resulting in a cost per residence of $19,200. This noise barrier is both feasible and reasonable.

Two noise barriers were evaluated for the west side of I-75 from Euclid Avenue to Custer Avenue. Barrier No. 6 would be 13 to 16 feet high and 1200 feet long. The estimated cost for this noise wall, at $330 per square meter, would be $543,156. This wall would provide 6 to 8 dBA of attenuation for the Sherrard Middle School and the Breitmeyer School. This noise barrier does not meet the $30,000 criterion. This assessment is typical of what would be expected for the other four schools in the project area.

The second noise barrier in this area, Barrier No. 7, would be located south of Clay Avenue between I-75 and the service drive. The northern terminus of the barrier would be immediately south of the on ramp to I-75 with the southern terminus just past Custer Avenue. The total length would be 490 feet with a height of 13 feet. The cost of the noise barrier would be $198,000 and the barrier would provide 6 decibels of attenuation for 10 residences. The cost per residence would be $19,800 which is well within MDOT's cost criterion.

The final two areas analyzed for noise mitigation were between Concord Street and Frontenac Street and between French Street and Fairview Street. Both of these areas are south of I-94. The first area was chosen because it had approximately 1,400 vehicles per hour on the service drive. The second area has only about 400 vehicles per hour on the service drive.

Barrier No. 8 was analyzed for eight residences south of I-94 between Concord and Frontenac Streets. The barrier would need to be 23 feet tall and 1000 feet long to provide a 6 dBA reduction in the peak hour $L_{eq}(h)$ noise level. The estimated cost for this noise barrier would be $704,550, with a cost per residence of $88,069. This barrier exceeds the $30,000 criterion.

The service drive traffic in the area from French Street to Fairview Street is approximately 400 vehicles per hour. Therefore, the influence of service drive traffic noise would be less than in the area for the previous noise barrier. Seven residences would receive a 5 to 6 dBA reduction from a noise barrier located between I-94 and the service drive. Barrier No. 9 would be 13 feet high and 1066 feet long. The estimated cost for this barrier would be $490,000. With only seven residences benefiting from this mitigation, the cost per residence would be $61,286 and does not meet the MDOT reasonable criteria.

Based on the noise analysis, MDOT intends to implement the mitigation measures that are feasible and reasonable. Barriers 3, 4, 5, and 7 meet the criteria. Because the analysis of the noise impacts and mitigation measures are based on preliminary design, the mitigation measures would be reviewed based on the final design. A final decision on the installation of these noise barriers would be made upon completion of the project design and the public involvement process.

5.7 Vibration

5.7.1 Existing Condition

Currently no known vibration impacts to properties along I-94 are occurring.

5.7.2 Impacts

Properties, including historic structures, along I-94 would be evaluated for the potential for vibration impacts prior to construction. Surveys for existing cracking caused by

vibration would be made. Structures that would be potentially susceptible would be those located close to the service roads. Excessive vibration could crack walls or foundations.

5.7.3 Mitigation

If surveys indicate a potential for short-term (construction) or long-term vibration impacts, mitigation measures appropriate to the structure would be developed. Construction equipment would be required to use low vibratory techniques to avoid short-term impacts. Appropriate long–term mitigation for vibration impacts resulting from increased traffic would be developed for each structure with the potential for vibration impacts.

5.8 Contaminated Sites

5.8.1 Existing Conditions

An initial review of the project area was done to identify known and potential contaminated sites. Known sites are those documented to have had releases or spills of hazardous substances. Potential sites are those that currently use or store, or have a past land use history of using or storing some type of polluting material. Sites include gasoline and service stations, warehouses, printing companies, photo shops, manufacturing companies, and locations with underground storage tanks (USTs).

Included in the initial review were published documents and information, historical aerial photographs, Sanborn fire insurance maps, city directories, and environmental database searches of local, state, and federal records. The records included those of the Michigan Department of Environmental Quality and the U.S. Environmental Protection Agency (EPA). This review process followed MDOT Real Estate Division and environmental requirements and identified 84 sites of potential concern within a 1 mile radius of the corridor.

Of the 84 sites initially identified, 30 sites are believed to be locations with known contamination and the potential to impact construction of the Build Alternative. Of the 30 sites, 25 are along the I-94 mainline, two are near the M-10 freeway, and three are along I-75.

5.8.2 Impacts

Impacts from contaminated properties may occur if: (1) contaminated property is acquired as part of right-of-way acquisition for the project; (2) existing contamination of soils or groundwater is spread during project construction; or (3) contaminated properties pose a physical danger to construction workers or the general public.

5.8.2.1 No-Build Alternative

No impacts are anticipated with the No-Build Alternative because it would require no property acquisition or additional right-of-way, and no substantial ground disturbance would occur except at locations where existing bridges would be replaced. Any hazardous materials that may have migrated into the existing right-of-way would remain mostly undisturbed.

5.8.2.2 Enhanced No-Build Alternative

Disturbance of contamination could occur with the Enhanced No-Build Alternative with the construction of ramps, auxiliary lanes, and pillars for bridge replacement. As replacement or reconstruction of portions of I-94 is scheduled, disturbance necessitated by construction and the sites in the area of the reconstruction would be evaluated.

5.8.2.3 Build Alternative

The Build Alternative would require excavation and drilling for freeway and bridge construction. To determine the degree of impacts to contaminated sites, the type and the extent of contamination would be determined prior to construction.

If a property to be acquired is determined to be contaminated, acquisition of the property and start of construction would be dependent upon mitigation of the contamination. Financial compensation for acquisition of the property could be adjusted to include mitigation costs.

5.8.3 Mitigation

After additional characterization and evaluation of sites prior to construction, requirements for handling impacted soils and worker safety measures would be developed and incorporated into final construction plans. Worker safety measures could include protective safety attire or monitoring contamination levels during construction. Impacted soils would require disposal in a location that meets requirements for contaminated soil disposition.

If any previously unidentified contaminated sites are encountered during construction of the Recommended Alternative, work at that location would cease and appropriate agency representatives would be contacted to arrange for proper treatment and disposal of those materials and to determine appropriate worker protection requirements. Any hazardous waste generated as a result of construction activities would be disposed of in accordance with local, state, and federal regulations.

5.9 Water Quality

Two types of effects to water quality are common to freeway improvement projects and may potentially occur in the project area with any of the alternatives: (1) an increase in

the pollutants contained in storm water runoff, and (2) erosion and sedimentation.

Roadways with heavy automobile traffic contribute non-point source pollutants, such as hydrocarbons, because of vehicle emissions and fluid loss. These pollutants are transported by rainfall runoff and may affect the quality of surface water and groundwater. Pollutants increase with increased traffic.

Erosion results when soil from disturbed surfaces adjacent to the freeway is washed onto the freeway by stormwater.

5.9.1 Existing Water Quality Conditions

5.9.1.1 Surface Water

The Michigan Department of Environmental Quality (MDEQ) Division of Land and Water Management was contacted to determine the location of regulated watercourses. Through the site inspection process, it was determined that no regulated watercourses, such as rivers, lakes, or other types of surface bodies of water, are located within the project area. The closest surface water is the Detroit River, which is outside of the project area.

Stormwater from I-94 currently enters a Detroit Water and Sewer Department (DWSD) combined sewer overflow system and is treated before it enters the Detroit River.

5.9.1.2 Groundwater

Depth to groundwater in the Detroit area is approximately 75 to 90 feet.

5.9.2 Impacts to Water Quality

The distance between groundwater and the freeway is sufficient to prevent contamination of the groundwater by implementation of any of the alternatives.

5.9.2.1 No-Build and Enhanced No-Build Alternatives

As traffic volumes increase in the future, pollutants on the freeway and in stormwater runoff are expected to increase.

5.9.2.2 Build Alternative

Implementation of the Build Alternative would increase size of paved, impervious area, which would add to the volume of stormwater runoff. Greater future traffic volumes will increase pollutants in the stormwater. The highest potential for erosion and sediment transport would be during the construction of the project. Sediment volumes may increase after construction because of increases in freeway debris and runoff volume.

5.9.3 Mitigation of Impacts to Water Quality

Stormwater from any of the alternatives would continue to flow into the DWSD combined sewer system and be treated before it is emptied into the Detroit River. Currently a conceptual plan to separate all Detroit stormwater runoff from the existing combined sewer overflow system is under review by the MDEQ. Runoff would be handled in a separate sewer system and flow to the Detroit River. If the plan is approved and implemented, the runoff from I-94 would be transferred to the new stormwater facility.

Areas may be available adjacent to I-94 to construct detention facilities to hold stormwater and pollutants it contains. During the design phase of the Build Alternative, stormwater detention facilities would be considered to mitigate increased pollutants and runoff.

5.10 Natural Resources

Natural resources in the project area were identified, evaluated, and assessed for potential impacts. Natural resources assessed were wetlands and floodplains, wild and scenic rivers and natural areas, vegetation and wildlife, federal- and state-listed threatened and endangered species, geological resources, and soils.

5.10.1 Wetlands and Floodplains

Wetlands are areas inundated or saturated by water at a frequency or duration sufficient to support vegetation typically adapted for life in saturated soil conditions. Wetlands are characterized by soil type, aquatic plants, and hydrology and have been known as bogs, swamps, and marshes. The area was surveyed for wetlands, and none was found. The U.S. Army Corps of Engineers, the agency with jurisdiction over wetland areas, agreed with this determination (Appendix J).

Floodplains are relatively flat areas adjoining the channel of a natural stream or river that has been or may be covered or inundated by water. MDEQ reviewed the project area for floodplains and determined that there are no floodplains in the project area (Appendix J).

Because the Build Alternative would not impact floodplains or wetlands, the proposed project complies with Executive Order 11988, *Floodplain Management*, and 11990, *Protection of Wetlands*.

5.10.2 Wild and Scenic Rivers and Natural Areas

No rivers or streams designated as wild or scenic are located within the project area. No designated natural areas are found within the project area.

5.10.3 Vegetation and Wildlife

5.10.3.1 Existing Vegetation and Wildlife

The Michigan Department of Natural Resources (MDNR) Wildlife Division was contacted to request information concerning the terrestrial flora and fauna in the project area. Through the MDNR database search, the study team concluded that the terrestrial community in the project area is limited by urban land use.

Wildlife observed or known to frequent the area is restricted to species typical of urban and suburban environments. Some of the more commonly identified species of birds found in the project area include sparrow, finch, cardinal, blue jay, robin, starling, and grackle, as well as other common members of the perching bird order. Mammal species known to frequent the area include opossum, raccoon, woodchuck, and fox squirrel. No reptile or amphibian species were observed in the project area during field surveys.

Upland flora is dominated by weedy herbaceous and shrub species. The herbaceous community consists of a predominance of species in the grass, mustard pea, and sunflower families. Shrubs identified were typical of borders of fields or lawns such as species in the willow, maple, and honeysuckle families. A project area vegetation survey list is found in Appendix K.

No farmland is located within the project limits.

5.10.3.2 Impacts to Vegetation and Wildlife

The No-Build Alternative would not impact flora or fauna. The Enhanced No-Build Alternative would disturb animal or plant species if vegetated slopes were used for auxiliary lanes or ramps. The Build Alternative would disturb the grassy slopes adjacent to the freeway and or vacant vegetated lots. Some residential or commercial ornamental landscaping could be removed. Disturbed animal species would likely move to other areas. No long-term impacts would be expected to occur.

5.10.3.3 Mitigation of Impacts to Vegetation and Wildlife

Ornamental plants and trees that are removed for construction of the Build Alternative would be replaced in kind. During final design of the Recommended Alternative, additional landscaping of the project area would be considered.

5.10.4 Threatened and Endangered Species

5.10.4.1 Existing Threatened and Endangered Species

Michigan Natural Features Inventory (MNFI) of the MDNR Wildlife Division and the U.S. Department of the Interior Fish and Wildlife Services were consulted to determine if

any federal- or state-listed threatened or endangered species were known to inhabit the project area. According to MNFI records for Wayne County, and based on an evaluation of existing habitat, nine plant and no animal species could occur within the project area. Of the nine plant species that were listed, four are threatened, while five are considered of special concern.

A field survey was done for threatened and endangered species. No federal- or state-listed threatened or endangered species of plants or animals have been identified within the project area.

A red mulberry (*Morus rubra*) was identified during the survey. It is a species of special concern. Prior to implementation of the Enhanced No-Build Alternative, if habitat is to be disturbed, or Build Alternative, the area would be surveyed for red mulberry.

A re-evaluation of threatened and endangered species would be performed prior to construction to ensure that conditions for these species have not changed.

5.10.4.2 Impacts to Threatened and Endangered Species

No impacts would occur to federal or state threatened or endangered species. The red mulberry could be encountered in the area to be disturbed for construction of the Build Alternative.

5.10.4.3 Mitigation of Threatened and Endangered Species

If a red mulberry were to be identified during the resurvey, the MDNR would be consulted. Avoidance would be the preferred method of mitigation. If avoidance were not possible, MDOT and MDNR would develop a mitigation strategy.

5.10.5 Geological Resources

5.10.5.1 Existing Resources

I-94 transects the Detroit Interlobate Moraine from the western edge of the project area eastward to Van Dyke Avenue. This broad subdued ridge is composed of generally boulderless glacial till originally deposited in water and is overlain with a thin veneer of proglacial lake sediments. Although almost imperceptible as a topographic feature, the Detroit Interlobate Moraine influenced presettlement surface drainage. Between Van Dyke Avenue and Conner Avenue, the easternmost edge of the project area, the till plain is characterized by a mosaic of lacustrine clay and loam soils. Additionally, within and adjacent to the rehabilitation corridor, a discontinuous series of linear spits and bars associated with the shoreline of the Grassmere stage of proglacial activity exists. The modern surface ranges in elevation from 605 to 635 feet above mean sea level.

The study team examined this urban area's geological resources using United States Geological Survey (USGS) maps for the project area and geological maps from the Wayne County Soil Survey.

5.10.5.2 Impacts to Geological Resources

Local topography would be altered by cut-and-fill activities necessary to prepare and construct new lane subgrades for either the Enhanced No-Build or the Build alternatives. No alternative under consideration would be expected to have a substantial impact on the geological composition of the project area.

5.10.6 Soils

5.10.6.1 Existing Soil Conditions

The Wayne County Soil Survey was consulted to determine the soil associations within the project area. Soil associations describe a pattern of soils dominated by a major soil group with at least one minor soil. Soils within a major soil group are typically classified by a series, which identifies soils with similar profiles and characteristics. The project area contains two documented soil associations.

The Pewamo-Blount-Metamora association is made up of soils that are nearly level to gently sloping and very poorly drained to somewhat poorly drained. These soils have fine-textured to moderately coarse-textured subsoil.

The Pewamo-Selfridge-Corunna association is also made up of soils that are nearly level to gently sloping and very poorly drained to somewhat poorly drained. However, these soils have a moderately fine-textured to coarse-textured subsoil.

These two soil associations are typical glacial till soils of the country's Upper Midwest region. They tend to be clay-rich and therefore less prone to erosion.

5.10.6.2 Impacts to Soil

All of the alternatives would disturb previously disturbed soils in the project area during construction of replacement structures or for new construction.

5.11 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800), requires federal agencies to take into account the effects of an undertaking on historic properties. In accordance with Section 106, archaeological and architectural reviews and surveys were performed in the project area. Consultation with the State Historic Preservation Officer (SHPO), archival searches relating to land use, block-by-block windshield surveys, deed searches, review of the archaeological site files of the Michigan

Historical Center (MHC), and Sanborn map review were used to identify cultural resources within the project area.

The cultural resources review and survey extended two blocks along either side of I-94, I-75, and M-10. The area is termed the Area of Potential Effect (APE). The APE is the geographic area within which an undertaking may directly or indirectly affect cultural resources.

5.11.1 Archaeological Resources

5.11.1.1 Existing Archaeological Resources

The archaeological resources investigation was performed to assess the current physical condition of the project area with particular attention to the nature and extent of archaeological resources. The APE includes few resources that could be accurately attributed to the pre-1885 period. Most archaeological deposits or sites predating 1870 would have a high archaeological sensitivity rating. However, within the project area virtually all of the original structures were razed or extensively redeveloped during the late nineteenth and early twentieth century subdivision of these formerly suburban and rural areas.

5.11.1.2 Impacts to Archaeological Resources

No archaeological resources are known and the proposed alternatives would not impact archaeological resources.

5.11.2 Historic Resources

The National Register of Historic Places (NRHP) is authorized under Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800). It is the federal government's list of cultural resources worthy of preservation. To be eligible for the NRHP, properties must retain physical integrity and must be evaluated for historical, architectural, artistic, or archaeological significance. Specifically, NRHP-listed properties should be older than 50 years and possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet at least one of the following criteria:

- Criterion A: Be associated with events that have made a significant contribution to the broad patterns of our history, or
- Criterion B: Be associated with the lives of persons significant in our past, or
- Criterion C: Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or
- Criterion D: Yield or be likely to yield information important in history or prehistory.

5.11.2.1 Existing Historic Resources

The historic resources investigation was performed to assess the structures in the project area and identify those that could potentially be affected by the proposed project.

Property identification is ongoing and will be completed prior to the Final Environmental Impact Statement. Several historic resources were identified within the project area (Figures 5-10A and 5-10B).

Historic Districts Listed on the NRHP. Virginia Park Historic District contains upper middle- and upper-class twentieth century residences in an intact neighborhood adjacent to M-10. The district lies on either side of Virginia Park north of the I-94/M-10 interchange. It is listed on the NRHP.

The Woodbridge Neighborhood Historic District is a middle-class, turn-of-the-century, residential neighborhood of one- and two-family houses located on the south side of I-94 west of M-10. Its boundaries are Trumbull Avenue, Hecla Street, Avery Street, Grand River Avenue, Rosa Parks Avenue, Willes Street, Alexander Street, West Warren Avenue, Wabash Street, the Grand Trunk Railroad tracks, and I-94 (Figure 5-11). The district covers approximately 162 acres in the northwest part of Detroit and is approximately 2 miles from the central business district. The neighborhood is laid out in almost-square blocks bisected by north-south service alleys. Most of the houses in the district were constructed between 1880 and 1925. The best-preserved houses are on Trumbull Avenue, Wabash Street, and Rosa Parks Avenue. Some infill apartment housing has been built in past years.

The buildings in the Woodbridge Neighborhood Historic District illustrate architectural diversity from the period 1885 to 1920. The houses range in form from Queen Anne-style houses to modest cottages. In a later building cycle, Stick-style and Second Empire-style houses with somewhat rambling floor plans were built within the district. The majority of houses are brick, two and one-half story, one- and two-family houses with houses are set back from the tree-lined streets, have sidewalks connecting the neighborhood, and are located close together on small, narrow lots.

Small apartment buildings were also built within the Woodbridge Neighborhood Historic District. A few emulated the architectural styles of the time including Art Deco influences and Georgian Revival architecture.

I-94/M-10 Interchange Bridges. The I-94/M-10 interchange was identified as historic in the 1995 *Michigan Historic Bridge Inventory* (Appendix L). The SHPO concurred with the inventory finding that the interchange meets NRHP Eligibility Criterion A for its association with post-World War II freeway construction and Criterion C for its unique design which makes it eligible for listing on the NRHP.

Draft construction plans for the I-94/M-10 interchange and its associated bridges were produced in 1945, construction began in 1948, and the entire interchange was finally completed in 1955. Although the construction dates of these structures do not yet meet the NRHP 50-year age criterion, during the course of design and construction of the project, the interchange will meet the criterion.

The I-94/M-10 interchange was the first freeway-to-freeway interchange designed in the Midwest, providing direct turning movements in all directions (Figure 5-12). The design was not the conventional cloverleaf but provided a unique arrangement of facilities for both right- and left-turning traffic, creating much interest in engineering circles. A model was constructed and shipped to New York City for the "Conference of the Future" held in 1952. The model was displayed at this conference because, in the opinion of engineers, it was the most outstanding design for a highway interchange in the country.

Although the interchange has 14 bridges, only eight that form the core of the interchange and an adjacent pedestrian bridge are eligible for listing on the NRHP:

- M-10 southbound over the M-10 northbound ramp to I-94 westbound
- I-94 eastbound over the northbound M-10 ramp to westbound I-94
- M-10 southbound over I-94
- I-94 eastbound ramp to M-10 over M-10 southbound and I-94 westbound
- I-94 westbound ramp to M-10 over M-10 northbound and I-94 eastbound
- M-10 northbound over I-94
- I-94 westbound over I-94 ramp from M-10
- M-10 northbound over I-94 ramp from M-10
- Holden Avenue pedestrian bridge over M-10

Buildings Eligible for Listing on the NRHP. Eleven individual structures near I-94 were identified as eligible for nomination to the NRHP: Balch School, the Church of Our Savior, the Eastown Branch of the YMCA, the Eastown Theater complex, Fisher Body Plant No. 21, the Ford Motor Company Piquette Avenue Plant, the Graphic Building, Packard Motor Car Company Building No. 10, the Trombly School, United Sound Systems Recording Studios, and the WSU Music Building (Figure 5-10A and 5-10B). Only United Sound Systems Recording Studio and the WSU Music Building are in close proximity to the proposed project.

The United Sound Systems Recording Studios is located in a building in the northeast corner of the intersection of Second Street and the I-94 north service drive. The building is a two-story brick building originally built as a residence. It has a two-story addition on the rear. Conversion from a residence to recording studios has compromised its architectural integrity.

United Sound Systems Recording Studios was founded in 1933 and was Detroit's first major recording studio. In the 1940s, United Sound Systems moved to its present location in the converted residence. In 1947, United Sound Systems Recording Studios was producing major jazz recordings including one by Miles Davis with Charlie Parker. In 1948, John Lee Hooker recorded there, and Johnny Ray recorded his first single in the early 1950s. Prior to the opening of his Motown studio, Berry Gordy produced recordings of Jackie Wilson and Smokey Robinson and the Miracles there. Other major artists included Aretha Franklin and Isaac Hayes. In 1997, United Sound Systems Recording Studios were closed.

It appears from review of available literature that the studio was a major force in local, regional, and national music recordings from the 1940s to the 1980s. It served a broad musical spectrum, including classical. Its significance was in African American contributions to American music and was important in the evolution of Berry Gordy and Motown.

Although it is not eligible for listing on the NRHP for its architecture, it is eligible under Criterion A because it is associated with events that have made a significant contribution to the broad pattern of our history and Criterion B because it is associated with the lives of persons significant in our past. Although some of the recording activity took place less than 50 years ago, its significance would appear to be an exception to the 50-year criterion of the NRHP.

The Wayne State University Music Building on Second Street was formerly the Real Estate Division offices for the Singer Sewing Machine Company of New York City. It is a two-story, brick building with a three-story, square corner tower. The row of windows is framed by concrete and divided by concrete pillars. It was constructed in 1949. It is an intact, unmodified example of small-scale, post-World War II commercial architecture and was designed by one of Detroit's leading architectural firms, Smith, Hinchman, and Grylls Associates, Inc. It is eligible for nomination to the NRHP under Criterion C because it possesses distinctive characteristics of a type, period, or method of construction, or it represents the work of a master, or it possesses high artistic values.

Prior to preparation of the FEIS, approximately 15 additional buildings identified for acquisition will be surveyed to determine NRHP eligibility. If any are found eligible, an additional Draft 4(f) Evaluation would be prepared for the eligible structures if the Build Alternative is the Recommended Alternative.

Buildings Listed on the NRHP. North of I-94 and east of M-10, two buildings, the Fisher Building and the General Motors Building, are listed as National Historic Landmarks on the NRHP. National Historic Landmarks are buildings, sites, districts, structures, and objects that possess exceptional value or quality in illustrating or interpreting the heritage of the United States in history, architecture, archaeology, engineering, or culture. The landmark must possess a high degree of integrity of location, design, setting, materials, workmanship, feeling, and association.

Four NRHP-listed properties are located south of I-94. The St. Josaphat Roman Catholic Church is on the northwest corner of St. Antoine and East Canfield streets. The East Ferry Historic District is on Ferry Street west of I-75. Cass Motor Sales is located at the southeast corner of Cass Avenue and the I-94 south. The St. Stanislaus Roman Catholic Church complex is on the corner of Medbury and Dubois. All of these properties are listed on the NRHP under Criterion C.

One NRHP-listed property is located north of I-94. Our Lady of the Rosary Roman Catholic Church is listed on the NRHP under Criterion C and is located at the northeast corner of the I-94 north service drive and Woodward Avenue.

Neighborhoods. The Fourth Street neighborhood at Holden and Fourth streets is an eclectic community of approximately 20 buildings. The buildings were recorded for the proposed I-94 project and evaluated for eligibility to the NRHP. Although the neighborhood is interesting, none of the buildings appear to be architecturally significant individually or collectively. The neighborhood does not appear to be eligible for the NRHP.

5.11.2.2 Impacts to Historic Resources

Section 106 of the National Historic Preservation Act of 1966, as amended, for purposes of assessing a project's impact on a resource describes impacts in terms of "effect." An undertaking may have no effect, no adverse effect, or adverse effect.

Historic Districts Listed on the NRHP. The Virginia Park District would not be affected by any of the alternatives.

One house and one store in the Woodbridge Neighborhood Historic District would be acquired to accommodate construction of the Build Alternative. Two vacant lots, a fenced automobile storage area, and lawns of two houses along the eastbound service drive would also be acquired. The house is located on the corner of Hecla Street and the existing service drive. The store is located at the existing service drive and Trumbull Avenue. Figure 5-13 contains photographs of the sites. The Build Alternative would require acquisition of the buildings that are on the periphery of the district. The proposed project would leave the majority of contributing structures in the district. There would be an adverse effect to the Woodbridge Neighborhood Historic District.

Traffic would increase on the eastbound service drive that is the northern boundary of the district. The increased traffic and the services drive's closer proximity to the district would have an adverse effect on the district.

I-94/M-10 Interchange Bridges

The No-Build Alternative would have no adverse effect on the I-94/M-10 bridges if the bridges can be repaired. As the bridges age, they would be rehabilitated to meet the Secretary of the Interior's Standards for Rehabilitation. If, in the future, the bridges require replacement, an adverse effect would result. Each bridge project, either rehabilitation or replacement, would undergo separate environmental review to determine the appropriate level of documentation.

The Enhanced No-Build Alternative would have an adverse effect on the bridges. The bridges would be removed and replaced with bridges of the same design and size on the same location.

The Build Alternative would have an adverse effect on the bridges. They would be removed and replaced with an interchange of different design and size.

Buildings Eligible for Listing on the NRHP. The No-Build and Build Alternatives would have no effect on buildings eligible for listing on the NRHP. The building housing United Sound Systems Recording Studios would be acquired and removed to implement the Build Alternative. An adverse effect would result.

Property now separating the WSU Music Building from I-94 would be acquired. After construction, the music building would be adjacent to the westbound service drive. The building would remain intact. None of the attributes that make it eligible for the register would be changed or affected by the service drive. The project would have no adverse effect on the property.

Buildings eligible for the NRHP, Balch School, the Church of Our Savior, the Eastside Branch of the YMCA, the Eastown Theater complex, Fisher Body Plant No. 21, The Ford Motor Company Piquette Avenue Plant, the Graphic Arts Building, Packard Motor Car Company Building No. 10, and the Trombly School, would not be affected by the Build Alternative.

Buildings Listed on the NRHP. The GM and Fisher buildings would not be affected by any of the alternatives of the proposed project because they are located approximately ten city blocks away from I-94.

Our Lady of the Rosary Catholic Church would not be affected. The service drive would be constructed on its existing location and would not move closer to the church.

The No-Build and Enhanced No-Build alternatives would have no impact on buildings listed on the NRHP.

Neighborhoods. Two buildings would be acquired from the Fourth Street neighborhood for the proposed Build Alternative. Although some of the buildings are over 50 years old, neither the buildings nor the neighborhood is eligible for the NRHP.

5.11.2.3 Mitigation of Impacts to Historic Resources

The Federal Highway Administration and the SHPO would enter into a Memorandum of Agreement (MOA) regarding adverse effects and mitigation of historic properties. An example is in Appendix A. The MOA would outline mitigation measures that would be proposed and stipulate that the MDOT would participate in the consultation between FHWA and SHPO. It would also state that MDOT was invited to concur that the undertaking would be implemented with measures to minimize harm. The MOA would then be submitted to the ACHP for concurrence.

I-94/M-10 Interchange Bridges. All of the Practical Alternatives would require that the I-94/M-10 bridges be recorded to meet standards of the Historic American Engineering

Record (HAER). The No-Build Alternative would rehabilitate the bridges to meet the Secretary of the Interior's Standards for Rehabilitation. To meet HAER standards if the No-Build Enhanced or Build alternatives are implemented, large-format photos, measured drawings, and a written description and history would be prepared prior to removal of the bridges and submitted to the SHPO.

The Woodbridge Neighborhood Historic District. The house and store removed as a result of the Build Alternative from the Woodbridge Neighborhood Historic District would be recorded to Historic American Buildings Survey (HABS) standards and the documentation would be submitted to the SHPO.

United Sound Systems Recording Studios. Different options are available to mitigate acquisition and removal of the United Sound Systems Recording Studios building (Figure 5-14). Preparation of a video documentary of the building and its history would be one option. Another option would be to evaluate the feasibility of moving the building to another location, rather than demolishing the building. In any case, the building would be documented to HABS standards. The documentation would be submitted to SHPO.

5.12 Energy

The energy requirements for construction of the Build Alternative are greater than the energy requirements for implementation of the No-Build alternatives. The construction of the Build Alternative would increase the vehicle miles of travel on I-94 within the project area, but a substantial increase in regional transportation energy use would not be expected to result from post-construction traffic levels.

Reduced traffic congestion on the arterial street system in the project area in combination with more efficient travel on I-94 would reduce local fuel consumption.

5.13 Utilities

Utilities are located throughout the corridor. The locations of above-ground utilities are currently known. These utilities include telephone and electricity lines and television cable. Below-ground utilities such as water, sanitary sewer, and storm sewer would be located prior to final design.

The No-Build and Enhanced No-Build alternatives would disturb utilities as maintenance and replacement of existing facilities occur. The Build Alternative would result in the greatest disturbance and would require relocation of utilities. Prior to construction, utilities would be relocated. Interruption of utility service would be avoided to the extent possible through coordination with the utility companies and entities.

5.14 Construction Impacts

The No-Build Alternative would have temporary impacts to travelers and residents during maintenance activities. The Enhanced No-Build Alternative would have temporary impacts as bridges, pavement, and ramps are reconstructed.

The Build Alternative would result in temporary impacts while improvements are being constructed and would have more substantial impacts than the other Practical Alternatives. It is anticipated that construction of the Build Alternative would occur in phases; therefore, impacts at any one location would not occur for the entire term of the project. Construction impacts would be short-term and would be unavoidable consequences of the proposed action.
The interstate system is essential to local and regional commuter traffic and regional goods shipment. MDOT is committed to reducing the temporary construction impacts to residents and travelers. Traffic impacts would result from temporary ramp closures and detours. Other impacts would include increased construction noise levels, changes in local traffic, pedestrian, and bicycle patterns, redirection of emergency vehicles, limited or modified access to local businesses, and temporary increases in dust and pollutants from vehicles and construction equipment.

5.14.1 Traffic Flow

5.14.1.1 Interstate Traffic Impacts

Implementation of any of the Practical Alternatives would result in temporary impacts to traffic flow while freeway improvements are being constructed. These impacts would vary in location and duration and would be unavoidable consequences of the proposed action. Potential impacts would include traffic on the interstate slowing or stopping and causing increased congestion and traffic finding alternative routes through neighborhoods.

5.14.1.2 Mitigation

Disruption of local and through-traffic patterns would occur during different phases of construction. The congestion that would occur on the interstates and arterial streets within the project area would be mitigated by the development and implementation of a traffic management plan (TMP). The TMP would be developed in conjunction with the detailed construction phasing plans as part of the project design phase. The TMP would identify detour routes and any necessary improvements to facilitate detoured traffic. The TMP would include requirements for construction of temporary facilities, freeway widening, and pavement re-striping. The TMP would also identify temporary traffic signs, freeway lighting, drainage facilities, and other temporary improvements that would be needed during each construction phase. The TMP would evaluate the effect that traffic detours would have on the affected arterial streets and would identify any minor improvements that would be necessary to accommodate the detoured traffic. The TMP would be developed in cooperation with the city of Detroit and coordinated with major

institutions and the affected business community to ensure that impacts to the arterial street system would be avoided where feasible.

A public awareness and information program for construction activities would be developed and implemented. The public information program would serve to increase public awareness of the benefits of the project, further identify concerns, and provide specific information to the public about construction project details such as:

- The location and duration of lane and ramp closures
- The routes to be used while closures are in effect
- Upcoming construction activities
- Information on alternative travel modes, such as transit
- General information on the project

Information would be communicated to the public using various available intelligent transportation system technologies such as fixed and variable message signs and highway advisory radio. The local news media would also be provided detailed information. A project-specific website would be available for those with access to computers. Other methods, such as a toll-free number and meetings with residents, business owners, and property owners, would be developed in consultation with the city of Detroit and with input from the general public and area businesses.

5.14.1.3 Impacts to Neighborhoods

Project area neighborhoods would experience impacts as a result of traffic that would enter neighborhoods while attempting to find alternative routes around construction zones. The increased traffic flow through residential areas could result in conflicts between local traffic and through traffic. The traffic would also result in increased noise and concern about the roadside safety of neighborhood children.

5.14.1.4 Mitigation

Construction phasing would reduce traffic impacts to neighborhoods. Continuing coordination among neighborhoods, MDOT, and the contractor would identify traffic flow impacts before and during construction and develop means to reduce traffic flow through the neighborhoods. Methods could include signing, temporary street barricades, or speed humps. The TMP would be important in mitigating impacts to neighborhoods.

5.14.1.5 Impacts to Businesses

Construction and related detours would disrupt access to businesses adjacent to or in the vicinity of I-94. Employees and patrons of businesses would experience greater difficulty reaching businesses.

5.14.1.6 Mitigation

Contractors would be required to maintain access to businesses at all times. Continuing

coordination with businesses would be essential to inform businesses of construction activity schedules. Prior to construction, a phasing plan would be developed to minimize access impacts.

Construction phasing and schedules would be developed for the Recommended Alternative, including pre-construction activities such as utility relocation, the construction of some bridge foundations, and other activities. A main objective of the construction-phasing plan would be to identify a sequence of construction that would maintain access and circulation throughout the construction period. The TMP would be an important element in reducing impacts to businesses.

5.14.2 Emergency Services

5.14.2.1 Impacts to Emergency Services

Emergency response may be modified during construction of any of the Practical Alternatives due to road closures and changes in access. In addition, congestion due to construction would contribute to delays in response time.

5.14.2.2 Mitigation

MDOT and the appropriate agencies would cooperatively develop an emergency response plan during construction to maintain emergency services within the project corridor.

5.14.3 Air Quality

5.14.3.1 Impacts to Air Quality

Air quality impacts during construction of any of the Practical Alternatives would include temporary increases in dust and pollutants from motor vehicles and construction equipment. Fugitive dust (dust with no controlled source) would be generated by grading and demolition activities and by the activities of haul trucks, earth-moving vehicles, and other construction equipment. Dust impacts could result from the movement of construction vehicles over paved and unpaved surfaces, dirt tracked onto paved surfaces from unpaved areas at access points, soil particles carried by the wind during grading, and material blown from haul trucks. Carbon monoxide emissions would increase within the project area as the speed of vehicles traveling through construction zones decrease and the volume of stop-and-go traffic increases. Air pollutants would also be generated by the operation of construction equipment and vehicles.

5.14.3.2 Mitigation

Following the best-available control strategies and complying with local, state, and federal regulations would reduce impacts to air quality. In particular, the following mitigation measures would be taken:

- Construction equipment would be maintained according to manufacturer's specifications.
- All equipment would be required to meet current air emission standards.
- Unpaved surface roads, parking areas, staging areas, and other open areas would be watered at a frequency necessary to minimize airborne dust. The frequency of watering would vary depending on soil moisture and wind conditions.
- All dirt stockpiles would be sprayed with water or other surfactants as needed to minimize wind-borne dust.
- All disturbed soil areas not subject to revegetation would be stabilized using approved nontoxic chemical soil binders, jute netting, or other appropriate methods.
- All trucks hauling dirt, sand, soil, or other loose materials off-site would be required to have covers.
- Dirt tracked onto paved roads would be removed at the end of each day or more frequently, if needed.

5.14.4 Erosion Control and Water Quality

5.14.4.1 Impacts to Erosion Control and Water Quality

Practical Alternatives construction activities such as demolition, excavation, grading, and equipment staging might erode the soil and increase sediments in surface water runoff that flows into the local storm sewers and eventually the Detroit River. These impacts could persist after completion of the project unless protective measures are taken. Although some deposition of petroleum products, rubber, metals, and total dissolved solids might be expected from the movements of construction-related vehicles, the amount of such contaminants reaching the river through runoff is likely to be negligible.

5.14.4.2 Mitigation

MDOT has a soil erosion and sediment control plan on file with the Michigan Department of Natural Resources. MDOT is required to follow the plan and manage and control erosion. MDOT is also required to submit notice of construction to Michigan Department of Natural Resources under NPDES for consistency and to provide a certified stormwater operator to conduct routine inspections

Temporary erosion control measures would be installed as construction begins and coordinated with permanent erosion control measures. The measures would be installed at the earliest practicable time during construction and maintained throughout the project. Special attention would be given to sediment transport caused by excavation, ground-cover removal, and erosion within the project area. Permanent adverse impacts from erosion related to construction are not anticipated.

Mitigation of impacts to water quality would include several measures:

- MDOT would design and implement measures, including best management practices (BMPs), to control and minimize the amount of eroded sediment that leaves the construction site. Strategies to contain other potential pollutants such as fuel, oil,

grease, and solvents would be included in the measures.

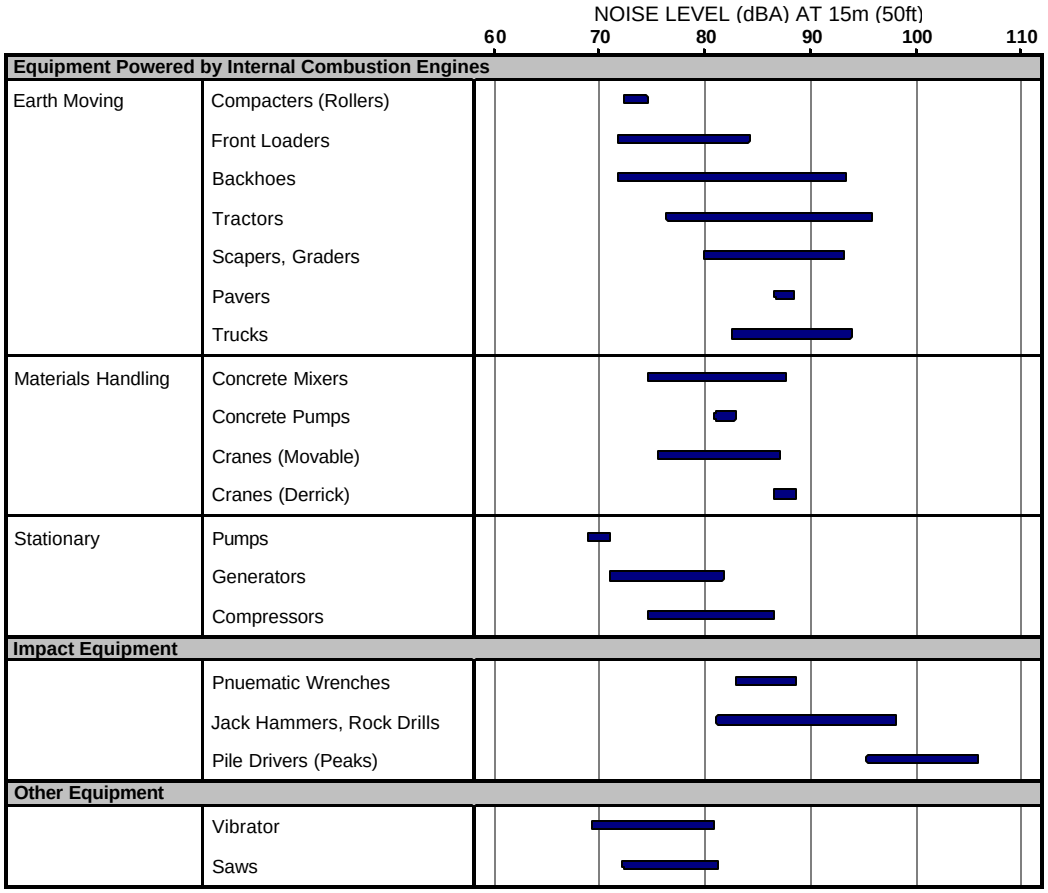
- Appropriate erosion-control measures would be installed, such as hay bales and silt curtains.
- Buffer zones (of hay bales or grass) would be established at the down-gradient boundaries of disturbed areas to prevent runoff into drainage channels. These buffer zones would reduce the velocity of overland water flows and trap eroded sediment that would otherwise migrate into drainage systems.

5.14.5 Noise

5.14.5.1 Noise Impacts

Construction noise impacts for passersby and those individuals living or working near the project can be expected. Table 5-15 provides information about noise levels for various types of construction equipment.

Table 5-15
Construction Equipment Noise



SOURCE: U.S. Report to the President and Congress on Noise, February, 1972.

5.14.5.2 Mitigation

Noise impacts could be mitigated by the following measures:

- Noise barriers to be constructed as part of the proposed improvements would be constructed as early as feasible in the construction phase. These barriers would serve to shield nearby residential areas from construction noise and traffic noise.
- The construction contractor would be required to adhere to all applicable local, state, and federal noise control ordinance requirements.
- Construction equipment would be maintained in good repair and fitted with manufacturer-recommended mufflers.
- Stationary construction equipment, such as generators, would be enclosed or shielded to block the direct path between the noise source and residences.
- Equipment maintenance that exceeds noise thresholds would be conducted off-site or as far from homes as possible.

5.14.6 Light

5.14.6.1 Light Impacts

Impacts from light sources used during nighttime construction of the Practical Alternatives could impact residences adjacent to the project.

5.14.6.2 Mitigation

As feasible, construction lights would be aimed directly at the work area and/or shielded from nearby residences.

5.14.7 Surface Streets

5.14.7.1 Impacts to Surface Streets

Damage to arterial streets could occur as result of use by heavy construction equipment to reach or move around construction areas for any of the Practical Alternatives.

5.14.7.2 Mitigation

Local roadways would be inspected before construction begins and at regular intervals during construction. Road damage caused by construction-related trucks or activities would be temporarily repaired during the construction period. After all construction has been completed, a final road inspection would be conducted and permanent repairs would be made as necessary.

5.14.8 Vibration

5.14.8.1 Vibration Impacts

Vibration could result from heavy equipment operation during construction of any of the Practical Alternatives. Vibration could damage structures and houses in the vicinity.

5.14.8.2 Mitigation

Soil boring would be performed at select locations prior to construction to help determine soil conditions and area susceptible to vibration impacts. Evaluations prior to construction would be used to design specific mitigation measures for possible vibration impacts. Special consideration for evaluation and monitoring would be given to historic structures.

5.14.9 Disposal of Excess Materials

5.14.9.1 Impacts from Disposal of Excess Materials

Construction of any of the Practical Alternatives would involve excavation of soils, removal of pavement and structures, and disposal of the material.

5.14.9.2 Mitigation

Disposal of unsuitable, contaminated, or other excess materials would be done in an environmentally acceptable manner and in accordance with applicable existing local, state, and federal regulations. Handling of excess borrow material will be in a manner consistent with erosion control practices.

5.14.10 Disruption of Utilities

5.14.10.1 Impacts from Disruption of Utilities

Temporary disruption of utility service and relocation of utilities would occur to accommodate construction of the Practical Alternatives. The exact locations of utilities are unknown at this time. Location of water and sewer lines, electrical and telephone lines, television and internet cable, and storm drains will be determined.

5.14.10.2 Mitigation

Detailed utility plans would be prepared for the Recommended Alternative during design. During construction, MDOT and its contractors would coordinate with the appropriate distributors to ensure minimal disruption of service to residents and businesses in the area. Any disruption of utility service during construction would be temporary, and business and residential customers would be notified of any service disruption in advance.

5.14.11 Visual Impacts

5.14.11.1 Visual Impacts

Temporary, short-term visual impacts during construction would range from evident changes within the right-of-way, including vegetation removal and earth-moving operations, to the construction of ditches, bridge approaches, and interchanges. Construction activity and the presence of related equipment would be temporarily intrusive to nearby viewers.

5.14.11.2 Mitigation

The area would be visually restored upon completion of the project through reseeding efforts and removal of construction-related refuse. Impacts would diminish as vegetation becomes re-established and viewers become accustomed to new views.

5.15 Secondary and Cumulative Impacts

Implementation of the improvements associated with the proposed project would result in both secondary and cumulative impacts. Secondary impacts are defined as indirect effects that are "caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR 1508.8). Cumulative impacts are defined as those that result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.8).

5.15.1 Secondary Impacts

New routes would result from relocation of ramps and bridges and traffic patterns would change. The Build Alternative would affect usage of the arterial street system. Some I-94 ramps would be removed from their current locations and replaced at new locations, while other ramps would be removed and not be replaced. Current plans include the following actions:

- Eastbound I-94 entrance ramp from Wabash Avenue (Fourteenth Street) would be removed and access would be provided via the I-94 service drives.
- Eastbound I-94 exit ramp to John R Avenue would be removed and replaced with an exit to Brush Street.
- Eastbound I-94 exit and entrance ramps to and from French Road would be removed and access would be provided either by the Gratiot Avenue or Conner Avenue ramps. From both of these interchanges, the continuous service drives and advance U-turns along I-94 could be utilized.
- Eastbound I-94 entrance ramp from Beaubien Street would be removed and access would be provided via the I-94 service drives.
- Eastbound I-94 exit ramp to Russell Street would be removed and replaced at a new location.

- Westbound I-94 entrance ramp from French Road would be removed and access would be provided either by the Gratiot Avenue or Conner Avenue ramps. From both of these interchanges, the continuous service drives and advance U-turns along I-94 could be utilized.
- Westbound I-94 entrance ramp from John R Avenue would be removed and replaced at Brush Street.

The Third Street bridge would be removed and vehicles would use the Second Street bridge that is one block away. Second Street would become a two-way street and cross I-94 to WSU and vicinity.

Travel patterns on surface streets would change in the vicinity of I-94. Traffic would increase on some streets and be reduced on other streets. In the vicinity of I-94, the number of vehicles using Wabash, John R, French, Beaubien, Russell, and Milwaukee would decrease, while the number of vehicles on Brush and West Grand Boulevard would increase.

The Build Alternative would result in positive secondary impacts. As aesthetics and access would be improved, they would facilitate revitalization and redevelopment of the communities in the vicinity of I-94.

Mitigation Measures. Changes in traffic patterns through neighborhoods would be evaluated for each neighborhood in consultation with the residents. Traffic calming measures to slow or reduce through traffic in neighborhoods would be considered. Measures would include speed humps, right-in only turns to streets from the service drives, right-out only from streets to the service drives, and cul-de-sacs.

5.15.2 Cumulative Impacts

Cumulative impacts are defined as effects which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions. The proposed improvements to I-94 are part of the rehabilitation and reconstruction of the urban interstate and street system within the metropolitan area. Several other transportation projects have been implemented recently or are planned and programmed for the next several years.

The city of Detroit is undergoing revitalization. New housing and commercial buildings are being built and existing structures are being remodeled.

5.15.2.1 Current Transportation Projects

Some of the projects recently completed or in the Transportation Improvement Program (TIP) for SEMCOG and the *MDOT Five Year Road and Bridge Program* are:

- Conner Avenue reconstruction from Mack Avenue to Warren Avenue
- I-75 reconstruction from I-96 to Gratiot Avenue
- Ambassador Bridge access improvements

- Woodward Avenue rehabilitation

Currently, MDOT is reconstructing a small portion of the I-94/I-75 interchange and the I-94 bridge over the Dequindre Yard. The existing I-94/I-75 interchange and adjacent bridge are deteriorating and require replacement before the I-94 Rehabilitation Project is completed. The Dequindre Yard project will reconstruct I-94 and I-75 in place with their current designs. Some sections of the project will be used for the eastbound I-94 lanes if the Build Alternative is implemented.

5.15.2.2 Cumulative Impacts of Transportation Projects

Some of the residents of the project area were relocated from other areas of Detroit for the original construction of the Detroit interstate system in the 1950s. They experienced displacement impacts. Other residents of the project area were impacted socially when I-94 was originally constructed. Some communities were divided, and members of those communities displaced. The social impacts that would result from implementation of the I-94 Build Alternative would again affect these residents. A cumulative social impact would result on residents who experience impacts from these transportation projects.

The proposed project is the first in a series of projects to improve I-94 in Detroit. Other freeways in Detroit will be improved in the future. Impacts of the interstate projects to biological resources would be avoided or minimal because of the urban nature of the location of the proposals. In general, incremental effects of past and future actions combined with the effects of the I-94 Rehabilitation Project are positive. The positive effects of these improvements include:

- Congestion on the interstate system would decrease as a result of the improved design and increased capacity.
- Air quality benefits would result from improved traffic flow.
- Noise impacts to residences adjacent to freeways and interstates would decline as a result of noise wall construction.
- Visual quality of freeway corridors would improve from landscaping and new bridge structures.
- The economy of the region would benefit from long-term and short-term construction-related jobs provided by the freeway projects.
- Mobility of pedestrians would improve as a result of new sidewalks along the continuous service drives.

The short-term impacts of the construction to support revitalization efforts in Detroit would combine with the short-term impacts of transportation projects in Detroit. For a period of years Detroit residents would experience several projects with their associated impacts. The sum of these construction impacts would result in an inconvenience and some frustration as residents travel, work, and live with various projects. Upon completion of the construction of the projects, the impacts will subside.

In the long term, a new I-94 and redevelopment in the area would result in improved aesthetics. The beneficial impact of I-94 on the redevelopment of the area could result in

infill development and new construction on vacant lots in the area.

As transportation facilities in Detroit improve, the cumulative beneficial impacts to the economy and social environment would far exceed the adverse impacts.

5.16 Relationship of Local Short-Term Uses Versus Long-Term Productivity

Environmental impacts would result during the construction of the proposed Build Alternative. The reconstruction of bridges and service drives would temporarily impact the mobility of local residents, access to businesses, and emergency services. The impacts would continue through the construction period, but local mobility and access would be returned and improved upon completion.

The project area is a part of local and regional transportation improvement plans for the city of Detroit and the southeast Michigan area. Implementation of Build Alternative improvements would be consistent with the goals and objectives developed as part of this planning process. The proposed project also incorporates the desires of local citizens and businesses and is consistent with the Southeast Michigan 2025 Regional Transportation Plan adopted by SEMCOG.

Proposed alternatives are based on the planning efforts established at the beginning of this study. These alternatives recognized mobility requirements and committed development plans as well as future land use development in the project area and the city of Detroit as a whole. Short-term impacts and the use of resources for enhancements and improvements to I-94 would be offset by the long-term productivity and economic health resulting from new development in the city of Detroit.

5.17 Irreversible and Irretrievable Commitment of Resources

Implementation of the proposed Build Alternative would involve the commitment of a range of natural, physical, human, and fiscal resources. Property that would change from private ownership to public ownership in the construction of the proposed improvements would be considered an irreversible commitment during the time period that the land is used for a highway facility. However, if a greater need arises for use of the land or if the highway facility is no longer needed, the land can be converted to another use. It is not expected such a conversion will occur.

Considerable amounts of fossil fuels, labor, and construction materials such as cement, aggregate, and bituminous material would be expended during construction. Additionally, extensive labor and large quantities of natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable; however, they are not in short supply and their use would not have an adverse affect upon their continued availability. Any construction activities would require a substantial one-time expenditure of both state and federal funds that are not retrievable.

The commitment of these resources is based on the concept that residents in the area, region, and state would benefit from the improved quality of the transportation system. The benefits would consist of improved accessibility, safety, savings in time, and greater availability of quality services which are anticipated to outweigh these commitments of resources.